A diverse assemblage of corals from the Late Oligocene of eastern Sabah, Borneo: pre-Miocene origins of the Indo-West Pacific marine biodiversity hotspot.

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A diverse assemblage of corals from the Late Oligocene of eastern Sabah, Borneo: pre-Miocene origins of the Indo-West Pacific marine biodiversity hotspot.

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The following work is submitted for a Master of Philosophy Degree.

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Abstract:

A diverse collection of corals has been collected from Sabah in Malaysian Borneo. The fossil localities studied have been accurately dated using a combination of nannofossils, larger benthic foraminifera and strontium isotopes, placing them within the mid to Late Oligocene, where previously they were thought to be of Miocene age. The corals have been taxonomically identified to genus-level and placed into likely species groups within each genus, descriptions and photographs of the majority of species are presented here. There are approximately 55 genera present in the collection, and about 100 species. The diversity of this region has been analysed and 3 compositional groupings of genera have been identified. Sampling methods have been identified as important in fossil diversity analyses. This fauna has been compared to other Cenozoic coral faunas from the Indo-West Pacific (IWP) and also from the Mediterranean and Caribbean. The origins of high diversity in the Indo-West Pacific region can now be said to have occurred at least as far back as the late Oligocene, but the region did not become the global hotspot for scleractinian diversity until the Miocene. The study area contains a majority of extant, zooxanthellate genera, suggesting that the Indo-West Pacific region may be a “centre of survival” (Hoeksema, 2007; Wilson and Rosen, 1998) for zooxanthellate corals.

Declaration:

All of the work contained within this thesis is my own work, apart from certain sections of Chapter 2. This chapter is based on a published paper that I co-authored with five other people. My contribution to the paper is explained in the Preface for Chapter 2 (p. 26) Also, I prepared all the data for Chapter 4, but K. G. Johnson produced the graphs for the diversity analysis.

Statement of Copyright:

Acknowledgements:

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I would like to acknowledge the kind help provided by my supervisors: Dr. Ken Johnson, Dr. Moyra Wilson, Dr. Howard Armstrong, Ms. Jill Darrell & Dr. Brian Rosen. Thanks also go to: Robert Madden and Emma Peng for their company and invaluable help while in the field; Lee Chai Peng (University Malaysia, KL) and Felix Tongkul (University Malaysia, Sabah) for their help arranging work permits and transport of specimens; Zainal, Ahmad, Faizal, Artiman and others from the Sukau River lodge and Sukau Village, who kindly provided food, lodgings, transport, field-assistants, and a second family for a month of my life. I am also grateful for the collaboration of Dr Jeremy Young, Dr. Cristina Manning and Mr. Peter Lunt in Chapter 2 of this work. Thank you to all members of the IWP ancient ecosystems group for their interesting discussions while in Leiden and to all the lovely people I have encountered at the NHM and Durham University during the course of my work. Lastly, many thanks are offered to my family & friends for supporting me.

Dedication:

Since contracting an illness on my fieldwork for this project and being diagnosed with Chronic Fatigue Syndrome, there have been times when I thought this project would never be finished. Therefore I would like to dedicate this work to anyone who has been through the same illness as I have. I would also like to dedicate this to my parents: Walter & Paula McMonagle for taking care of me during my illness, and my friends: Matthew Brown, Mark Eldridge and Jordan Bielby who have kept me going through all of this: This work would not exist without your love, laughter and support. Thank you all so much.

Contents:

List of Illustrations:

Chapter 3:

Chapter 4:

Chapter 1:

Introduction

Chapter 1: Introduction:

1.1 Aims of the Project:

I. To establish the accurate age and describe the diversity of a Late Oligocene deposit of reef fossils (mainly corals) from the Kinabatangan region of Sabah, Malaysia.

II. To understand what controls the diversity of corals at this time, both locally (within the Indo-West Pacific) and globally (e.g. compared to the Caribbean).

III. To use this data to elucidate on the origins and early evolution of centres of marine biodiversity.

1.2 History of Research

Scleractinian corals are widely recognised as the main framework builders of coral reefs. As such, they are the founder organisms for Marine Biodiversity Hotspots. As primary producers, they provide food and habitat niches for many other marine species and are undeniably useful to the human population, as they provide a rich supply of food, base materials used in local crafts and medicines, shoreline protection from the extremes of the ocean, as well as a beautiful natural environment that can form the basis of successful tourism industries (White *et. al.*, 2000). Even though coral reefs are recognised for all of these uses, their survival is being threatened by destructive fishing practices, pollution, disease, algal blooms, ocean acidification and global warming (Lesser, 2004; Baker *et al.*, 2008; Knowlton and Jackson, 2008; Doney *et al.*, 2009; Bauman *et al.*, 2010). Study of fossil reefs should provide us with the information required to distinguish between anthropogenic impacts and ecological change in response to natural variability in the environment, and also help us to plan effective reef conservation strategies by understanding the processes that drive reef evolution (Jackson and Johnson, 2000; Briggs, 2005; Roche *et. al.*, 2010).

The present-day Marine Biodiversity Hotspot is located in the Indo-West Pacific (IWP) Region. Around 60-70 genera of scleractinian corals can be found within the highest diversity areas of this region, compared to around 20-25 in the Western Atlantic reef-building province (see Chapter 2, figure 1). The so-called "coral triangle" or IWPCMB (Indo-West Pacific Centre of Marine Biodiversity) is an approximately triangular area that extends from the Philippines in the north, to the eastern Indian Ocean in the west and Papua New Guinea in the east, with a small extra part extending down to North-Western Australia in the south (see figure 1, this chapter; Hoeksema, 2007). The origins of this Centre of Marine Biodiversity are not known, although it must have developed at some point at, or prior to, the Neogene, because diverse marine assemblages are already present in the early Miocene within the IWP region (e.g. the Gerth Collection, housed at the Natural History Museum in Leiden, the Netherlands; Renema and Leloux, 2007). There is evidence to show that a previous centre of marine biodiversity was located in the western Tethys Ocean, in the late Middle Eocene epoch, (approximately where the Mediterranean sea lies in the present day) (Renema *et al.*, 2008), so at some point between then and the Pliocene, the IWP became the single most biodiverse marine habitat on the globe. Veron (1995) states that tropical biotas "*…declined throughout the [Oligocene] epoch*", and presumably includes corals within this category. However, in the same book, he later mentions the extensive development of reef and coral communities from the Late Oligocene to the Middle Miocene in the SE Asian region, as documented in Fulthorpe and Schlanger (1989).

Figure 1. Map of IWP Centre of Marine Biodiversity (IWPCMB), red outline indicates approximate area of highest coral diversity. Adapted from Hoeksema, 2007 (figs. 6D & 8).

The IWPCMB area contains high biodiversity for a number of marine taxa, such as gastropods, bivalves, barnacles, decapods, larger benthic foraminifera, fish, dinoflagellates, echinoids, mangroves, seagrasses and corals (Hoeksema, 2007; Renema *et al.*, 2008), and for many of these taxa, molecular and fossil evidence shows that this high diversity was present from at least the Neogene onwards (Renema *et. al.*, 2008), with many of the coral species found in the IWPCMB today having been in the area since at least Pliocene times (Veron and Kelley, 1988; Boekschoten *et al.*, 1989). As diverse assemblages of corals have been found in the IWPCMB from the Miocene onwards, the area has clearly been suitable for colonisation by a variety of reef-corals and associated organisms for many millions of years. It has been noted that these Neogene coral faunas differ from those collected from Paleogene units, as the reef assemblages so far found have been much richer and more common in the Miocene than in the earlier parts of the Cenozoic (Wilson and Rosen, 1998). Prior to the Neogene, a "Paleogene Gap" in the zooxanthellate coral record for the region has been described (Wilson and Rosen, 1998). Wilson and Rosen (1998) describe the "Paleogene Gap" in the Indo-West Pacific region as being caused by a combination of oceanic isolation from more coral-rich areas, and perhaps also a lack of availability of Paleogene carbonate formations to study, although those that are available apparently show only small, non-endemic faunas during this period. They state that "*The Cenozoic record of z-corals points to the modern Indo-West Pacific centre of diversity being a young feature, probably little older than around the beginning of the Neogene (c.24 Ma)*". However if lack of study is an issue, it is therefore possible that the origin of the IWP biodiversity hotspot may have occurred prior to the Miocene epoch, and that diverse coral collections may still be found from the Paleogene. Either way, more knowledge of Paleogene carbonate outcrops in the IWP is required.

At around the Late Oligocene/Early Miocene boundary a large increase in carbonate deposition (deposited originally as coral reefs) occurred in the Sabah area, as part of an observed increase in carbonates across the whole of SE Asia (Fulthorpe and Schlanger, 1989; Perrin, 2002; Wilson, 2002 and 2008; Tcherepanov *et al.*, 2010). Although the mechanisms for this are not yet completely understood, it has been suggested that global CO_2 levels, regional oceanographic change, nutrient influx and precipitation may all be probable causes (Wilson, 2008). It is possible that the increase in carbonate depositional area that occurred during the Early Miocene was related to the appearance of a new scleractinian coral taxon (the main carbonate producing organisms of the present day) able to produce carbonate at a faster rate e.g. a coral with a higher rate of skeletal extension (Lough and Barnes, 2000; Johnson and Perez, 2006). Perhaps the carbonate increase was nothing to do with coral diversity at all? Johnson *et al.* (2008) showed that, in the Caribbean region, reef development and therefore carbonate accumulation were unrelated to coral diversity and are more likely to be due to changes in surface productivity in reefal areas, as well as the ecological characteristics of the dominant coral species. Other support for this can be found in Perrin (2002) who states that during the early Miocene acme of reef development "*…highly diverse communities do not appear to have been the rule, because they account for only ~20% of the total number of buildups for which estimates of taxonomic richness are avai*lable". It is more likely that the change was due to environmental and oceanic factors, which allowed pre-existing corals and other $CaCO_3$ producing organisms to grow and thrive more successfully than they could before. This may be down to greater habitable area being created due to increase in amount of shallow seafloor available for colonisation, oceanic temperature changes, or variations in nutrient availability. To find out which scenario is more likely to be the case within the IWPCMB, the timing of diversity change in the region must be better understood. If environmental or biotic factors influence diversity and/or carbonate production, are they locally relevant or are they globally relevant? It is possible that all of the previously mentioned factors have had some role to play. So it is therefore hoped that this study, from a crucial time and place in the IWP marine region can provide, at the very least, some useful information and bring us a step closer to answering these questions.

1.3 Global comparisons:

There are three major centres of reef formation on the globe today, these are: the Caribbean, the Mediterranean and the Indo-West Pacific (the IWP being the most diverse). During the Late Oligocene-Early Miocene the Caribbean and IWP areas had some of the thickest reef facies, i.e. the highest rates of reef carbonate deposition. The Mediterranean also had a high concentration of reef build-ups, but reef sequences were limited to about 100m in thickness, possibly due to the region's more northerly location (Perrin, 2002). Caribbean corals and other reef-associated organisms underwent a period of faunal turnover (near-simultaneous origination and extinction) in the Late Oligocene-Early Miocene (Edinger and Risk, 1994; Dixon and Donovan, 1994; Budd, 2000, Johnson and Kirby, 2006). This event coincided with a decrease in reef building throughout the area (Johnson *et* *al.*, 2008). The Mediterranean also suffered a decrease in diversity (extinction event), which appears to have occurred at the Oligocene/Miocene boundary (Bosellini and Perrin, 2007). Comparison of the diversity in these areas at the Oligocene/Miocene boundary, with the fauna identified in this work, may help in discerning whether adaptation to changing local conditions was the driving force behind coral species origination and extinction at this time, or if globally acting variables had more of an effect.

1.4 Study Area:

The study area is located in the Kinabatangan Lowlands, within the province of Sabah, Borneo in SE Asia. In October 2006 a pilot study was undertaken to assess (1) the fossil richness of the area and (2) the potential of the area for a larger-scale study. The results of this one-week pilot study showed that there was a high species diversity of reef corals present at a number of outcrops in the area, and that a larger scale study was definitely achievable. A second, month-long field trip to Malaysia was completed in July 2007. A total of four weeks (over both years) was spent in the study area.

The Province of Sabah lies almost centrally within the area demarcated by the present-day Coral Triangle (Figure 1.), and the landmass has been situated in approximately its present location for the whole of the Cenozoic Era, as Borneo is a stable margin of a larger landmass that was once part of the Asian continent, called Sundaland. Sections of this land have since subsided to leave the larger islands (Borneo, Sumatra and Java) of SE Asia in its place (Hall, 2001; 2002; 2008). Basins began to develop (due to extension in the region) to the south, west and north-west of Borneo by approximately the Middle Eocene, and these were typically filled by either terrestrial or shallow marine clastic sediments (Hall, 2008), the latter being the case for the fossil bearing localities studied in this work. Previous work on the carbonate sedimentology in the area (Noad, 1998; 2001) noted the abundance of fossil reef organisms in the area, cursory identifications were made of 39 species of corals in

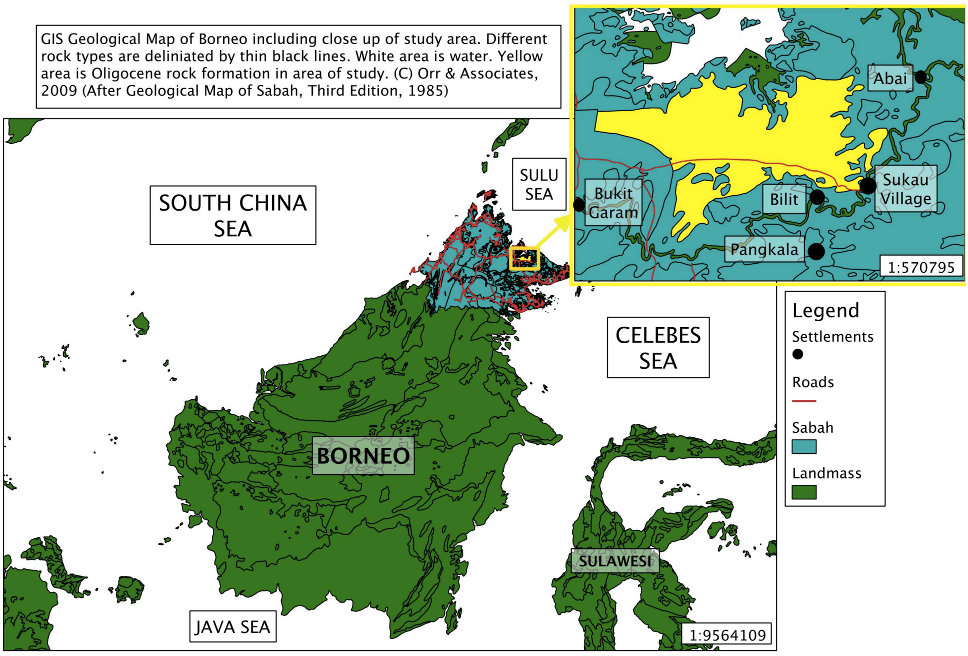

Figure 2. Map of study location on Borneo (scale is shown in lower right corner).

approximately 27 genera but no detailed diversity data was recorded, as the study was related to the overall sedimentology of the area rather than the palaeontology. The results of Noad's (1998) work suggested that the carbonates in this area were deposited as patch reefs (due to thickness and lateral extent of exposures) growing in an east-west trending foreland basin (Central Sabah Basin), on a near-shore shallow marine shelf,

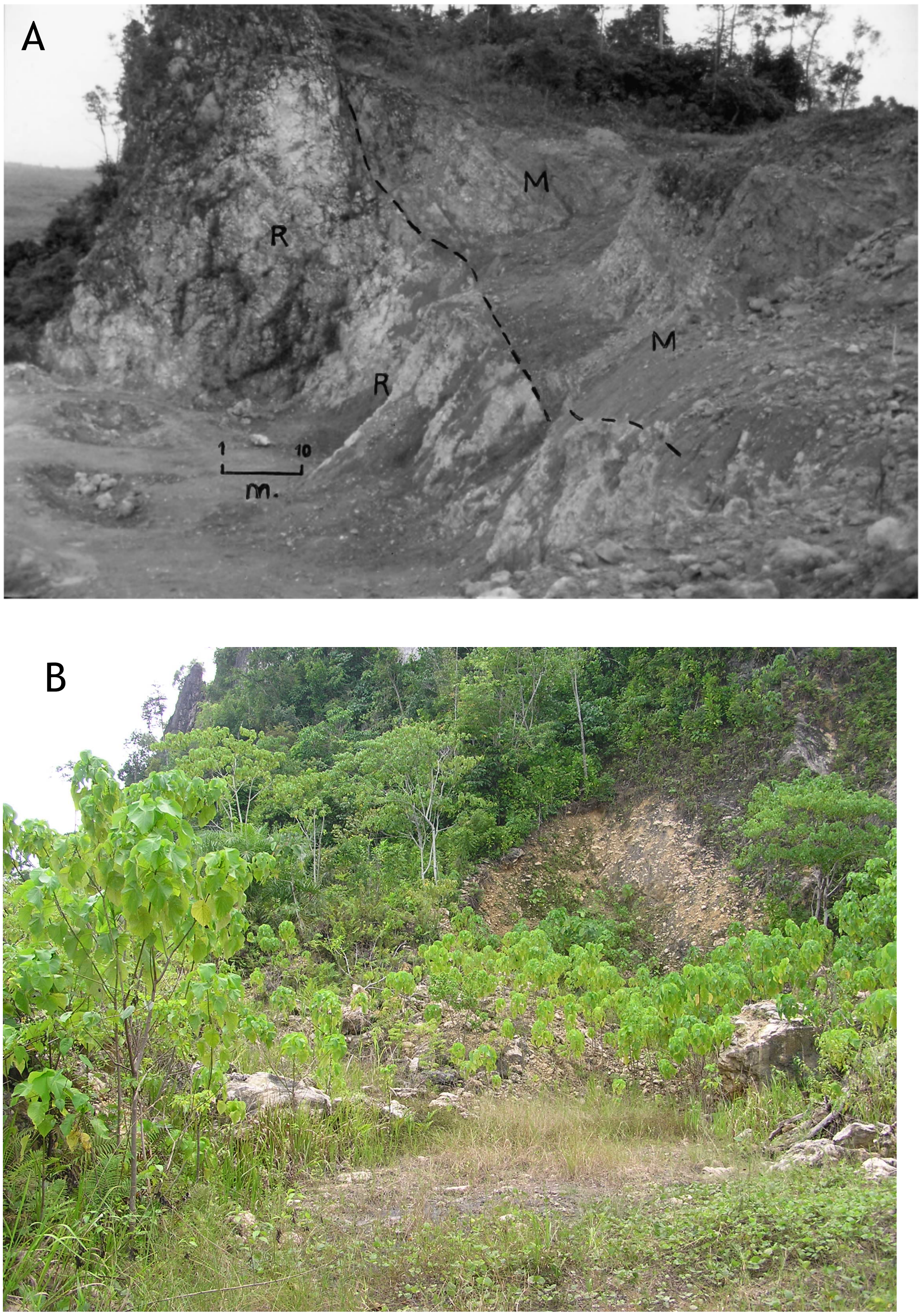

Figure 3. Photos showing the level of weathering and vegetation colonisation of the sites between 1998 and 2007. **A)** Sukau Road Quarry in 1998 (reproduced from Noad, 2001); **B)** Sukau Road Quarry in 2007 (taken looking towards exposure rather than along it - approximately from the left-hand bottom corner of A looking towards the right-hand top corner)

dominated by clastic sedimentation. Hutchison (2005) is also in agreement with this interpretation. These areas of reef carbonate have been attributed to the Gomantong Limestone Formation, and dated as Late Oligocene - Early Miocene (Chattian to Burdigalian) age (Haile and Wong, 1965; Wilson, 2002; Noad 1998, 2001).

The localities chosen for study comprised a series of road cuttings and stone quarries that exposed poorly-lithified, micrite and mud matrix (blue-grey in colour when fresh, yellow-orange when weathered), in the form of packed biomicrite or wackestone (Dunham, 1962; Tucker and Wright, 1990; Fichter, 1993) containing numerous fossils of reef-corals, larger benthic foraminifera, bryozoans and molluscs, along with associated micro- and nannofossils. All localities are located close to the main road that leads to Sukau Village, near to the Kinabatangan River in Sabah, (N.E. Borneo) Malaysia (Figure 2.). These localities were previously studied by Noad (1998), however in the 8-9 years following, many of the exposures had been heavily weathered and some were even re-colonised by local vegetation (Figure 3.) due to the wet and tropical climate. As a consequence, only basic log sections could be performed for this study, as much of the original bedding was obscured by the weathered rock and vegetation (these log sections are not included in this work, but photographs of the exposures can be seen in Appendix 1). A very good account of the regional geology of Sabah can be found in the work of Balagaru and Nicholls, (2004) and further details of the sedimentology are in Noad (1998). Stratigraphic results will be discussed in the next chapter.

Chapter 2:

Age Dating of the Study Area

2.1: Preface:

The following chapter is a paper published in 2011 in the journal Palaeogeography, Palaeoecology, Paleoclimatology that I co-authored (McMonagle et al. 2011). It is based on a combination of data that includes larger benthic foraminifera identification carried out by Moyra Wilson, confirmed by Peter Lunt, nannofossil identification performed by myself, under the supervision of Jeremy Young, and strontium isotope dating carried out by Christina Manning. Kenneth Johnson supplied further information on corals and significance of the study for our understanding of the origins of the SE Asian marine biodiversity maximum.

The writing of the paper was coordinated by Moyra Wilson, and I (minor corrections to the text have been necessary for inclusion as part of this thesis). I provided the information on the nannofossil dating, locality information, and parts of the general text (about 15-20 %). I also collected the material used for the Sr isotope dating and the nannofossil identification during my fieldwork in Malaysia, where I made a fossil collection of the diverse coral fauna and other reef-associated organisms present at the studied outcrops within the (assumed) Gomantong Limestone (see Chapter 3 for details of the coral fauna). These are now housed at the Natural History Museum, London (NHM).

In order to be able to identify the nannofossils myself, I was kindly allowed to attend relevant lectures on Cenozoic nannofossils from the Microfossil MSc course held at UCL, taught by Jeremy Young and Paul Bown (both at UCL). I was also permitted use of the microscopy facilities in the NHM Palaeontology Department.

2.2: Publication Details

Palaeogeography, Palaeoclimatology, Palaeoecology 305 (2011) 28–42
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Title:

A re-assessment of age dating of fossiliferous limestones in eastern Sabah, Borneo: Implications for understanding the origins of the Indo-Pacific marine biodiversity hotspot.

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2.3. Introduction

SE Asia is renowned as a ‘hotspot’ of marine biodiversity having the highest modern global diversity of corals (400–500 species) and reef related organisms (Fig. 1; Stehli, 1968; Briggs, 1974; Veron, 1995; Paulay, 1997). However, despite its significance, the origins and evolution of this diversity hotspot (known as the Indo-Pacific Centre of Diversity) remain poorly documented. In particular there is a paucity of fossil data from the most important element of the reef ecosystem: the corals (Hoeksema, 1989; Wilson and Rosen, 1998). Fossil data when combined with genetic and modern distribution studies are a powerful tool in evaluating the history of biological diversity (Rosen, 1988). Corals are particularly useful for fossil diversity studies since they produce skeletons that are commonly fossilised in the shallow marine strata close to where they once lived. New collection of rigorously age-constrained, detailed taxonomic and diversity studies of fossil-rich successions is critical to documenting changes in reef diversity and evaluating controls on biodiversity hotspot development. This study focuses on constraining the age of coral-rich deposits from: (1) a key time interval: the Oligo-Miocene boundary, and (2) a key locality: the Kinabatangan area of NE Borneo, located in the midst of the present day marine diversity hotspot (Fig. 1).

Many outstanding questions remain over the Indo-Pacific Centre of Diversity. There is ongoing debate over the timing of origination of the Indo-Pacific Centre of Diversity. There is evidence that the regional diversity increased at approximately the Oligo-Miocene boundary (Gerth, 1925; Umbgrove, 1930;

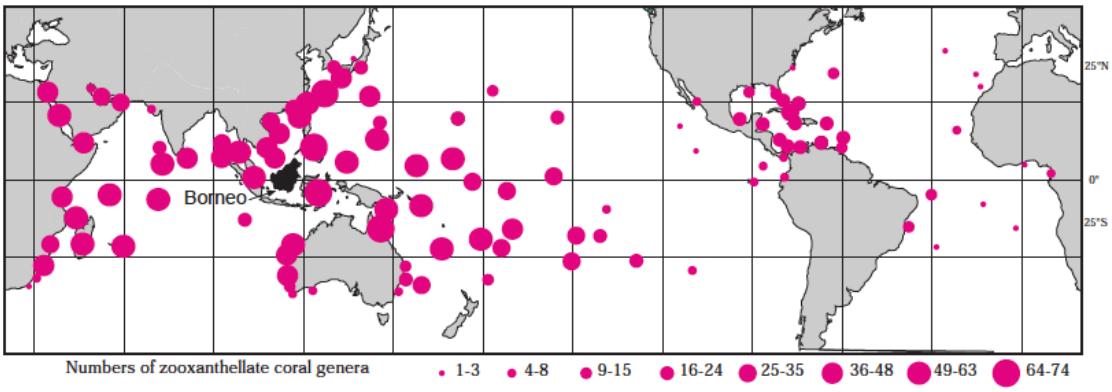

Figure 1. Location of Borneo (this study) and diversity (numbers of genera) of Recent zooxanthellate corals. Localities and data are mostly based on unpublished compilation by Professor John W. Wells. Broken lines indicate the Tropics. Latitude and longitude in 5° intervals. Map from Wilson and Rosen (1998), after Rosen (1984).

Wilson and Rosen, 1998), with additional increased diversification in the Late Miocene or Pliocene (Umbgrove, 1946; Potts, 1983). Renema *et al.* (2008) showed that for larger benthic foraminifera, the centre of diversity was already present in its current Indo-Pacific location in the Early Miocene. As compared to other regions (Budd 2000; Bosellini and Perrin, 2008; Perrin and Bosellini, 2012), regional changes in reef coral diversity during the Cenozoic (last 65 million years) are poorly known (Rosen, 1988; Wilson and Rosen, 1998), and mostly reliant on collections made by geologists working for the Dutch colonial offices in the late 19th and early 20th century and described in the first half of last century (Gerth, 1925, 1930; Umbgrove, 1946). It is unknown whether coral diversity mirrors availability of habitable shallow marine areas, i.e. tracking the regions carbonate record (Fulthorpe and Schlanger, 1989; Wilson, 2002, 2008) or whether diversity is decoupled from habitat extent (Kiessling, 2005; Johnson *et al.*, 2008). There is ongoing debate over major controls on marine biodiversity with tectonics (Wilson and Rosen, 1998; Renema *et al.*, 2008), eustatic sea level fluctuations (Potts, 1983; Fulthorpe and Schlanger, 1989), global climate and local environmental change (Morley, 2000; Wilson, 2008, 2011) all implicated as explanations for the regional pattern. Helping to answer some of these outstanding questions has implications not only for understanding development of the Indo-Pacific Centre of Diversity, but (if global change is a factor) for biodiversity hotspots in general.

In order to plan effective marine conservation strategies in the present day, the effects on marine speciation over geological time must be understood. SE Asia with its biologically diverse, but threatened reefs (Bruno and Selig, 2007), is much in need of pointers to aid conservation strategies. The location and age of fossil-rich units (carbonates and mixed carbonate-clastic deposits) is also important for unravelling the tectonic history of SE Asia: one of the world's most tectonically active regions (Hall, 1996; 2002).

In this paper we outline new evidence for age dating coral-rich deposits of the Kinabatangan area (Fig. 2; including the Gomantong Limestone) through: (1) biostratigraphic (nannofossil and larger benthic foraminifera) data, and (2) isotopic dating (Sr isotopes) tied to the GTS04 timescale (Gradstein et al., 2004). We briefly explore the consequences of age dating for the history of biodiversity in the region. Chapters 3 and 4 in this work will detail the taxonomy and diversity of the corals and compare data with hypotheses of biodiversity development.

2.4 Geological setting

The Kinabatangan area is located in the eastern part of the Malaysian province of Sabah, in NE Borneo (Fig. 2; Noad, 2001; Balaguru and Nichols, 2004). Borneo is situated within the highest diversity region of the Indo-Pacific Centre of Diversity: a rough triangle joining the Philippines, Peninsula Malaysia, and Papua New Guinea (Fig. 1; Ekman, 1953; Rosen, 1984; Paulay, 1997). Fossil-rich deposits comprise localised units up to 300 m thick and tens to hundreds of metres extent of: (1) near pure carbonates, and (2) mixed carbonate-siliciclastics in an area otherwise dominated by poorly-fossiliferous siliciclastics (Fig. 2). The fossiliferous deposits have variously been assigned to the Gomantong Limestone, the Lower Kinabatangan Formation and the Togopi Formations and there is considerable confusion over stratigraphic assignment and dating (Fig. 3; see previous work section). The carbonates are well known to local people as a source of guano, swiftlet nests (for 'birds nest soup' from the Gomantong Caves) and useable quality road stone (Noad, 1998, 2001). An excellent and diverse fossil coral assemblage has been obtained from the muddy mixed carbonate–clastic deposits (See Chapters 3 and 4). This chapter focuses on the dating of these and the near-pure carbonate units (Fig. 4).

The dominance of clastic sedimentation in north Borneo includes the complex of mélange and turbiditic sediments of the Palaeocene?, Eocene through Oligocene, Trusmadi, Crocker and related formations, that are up to 10 km thick and now uplifted to form the Crocker Ranges (Liechti *et al.*, 1960 and later workers). In Eastern Sabah clastics and rare carbonates accumulated in a large E–W trending Paleogene to Miocene basin, whose development may be related to spreading in the Sulu Sea (Rangin et al., 1990a; Daly et al., 1991; Hall, 1996; Noad, 2001). The basin is underlain by the “Chert-Spilite Formation” (cf. Liechti et al., 1960; Wilson, 1964), which includes Mesozoic radiolarian cherts and pillow lavas of oceanic crust and/or ophiolitic origin,

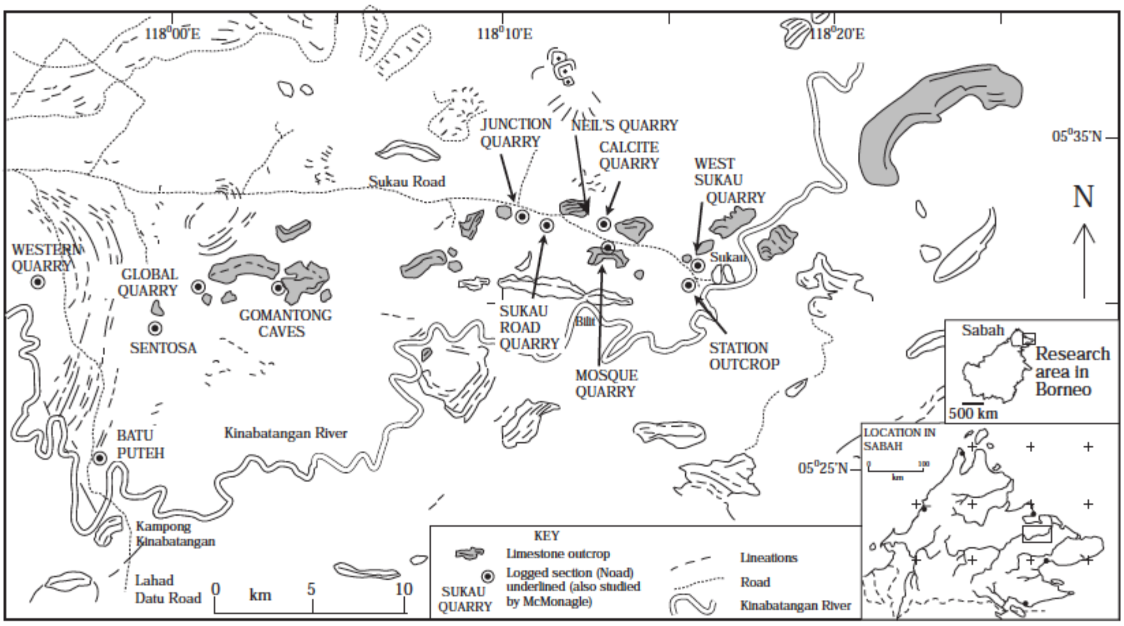

Figure 2. Location map of the main studied sections of limestones from the Lower Kinabatangan area (after Noad, 2001: interpreted SAR image). Inset maps show location of research area in Borneo and within Sabah. Named sections are those of Noad, 1998, 2001. Sections underlined are those also studied in detail during this project. Sanctuary Quarry, Lower Sanctuary Quarry, Lake Quarry and Rubbish Dump Quarry (of this study and listed in younging stratigraphical order) are equivalent to a much altered version of Calcite Quarry. Police Outcrop of this study is in part equivalent to West Sukau Quarry and Station Outcrop.

forming basement in this area (Hutchison, 2005). Within the Sabah basin the Paleogene sediments (Kulapis and Labang formations) are most commonly siliciclastics with sole markings, graded bedding and Bouma subdivisions interpreted as bathyal turbidite deposits (Clennell, 1996). Although biostratigraphic indicators are locally rare, during roughly middle and later Oligocene times calcareous micro- and macrofossils became much more common, although as Haile and Wong (1965) noted, there is a concern that fossils of shallow marine origin may be partly allochthonous. Even if these are locally slumped, or transported as debris flows, the very existence of such assemblages in a wide area where there had been no record of shallow marine facies for well over ten million years is highly significant. Higher energy sandstone deposits are also seen to increase in abundance over the same later Oligocene period (Upper Labang Formation of Clennell, 1996). Noad (1998) interpreted the depositional environment of the Labang Formation as highly variable including distal turbidites, upper slope gully fill turbidites and middle to lower shoreface. The sequences of limestones covered by this study are from this period of lithological and environmental change (Fig. 4). Above these limestones are regionally extensive mid-Miocene to Recent mélange and clastic deposits, located on- and offshore Sabah, which are also several kilometres thick (Clennell, 1996; Noad, 1998; Petronas, 1999). All of the Paleogene turbidites, the mid-Oligocene to basal Miocene coral-, and larger foraminifera-bearing sediments, and the mid-Miocene and younger mélange deposits have been used to support regional tectonic models for the South China Sea to Sulu Sea area (Clennell, 1996; Noad, 1998, 2001). However as fundamental inputs to such geological models become clearer these models are in need of re-consideration. Such inputs include the re-dating of the spreading adjacent oceanic basins (Barckhausen and Roeser, 2004: South China Sea), and re-dating of sediments and recognition of unconformities in this and other papers (Balaguru and Nichols, 2004; Hutchison, 2005). Minor limestones of the Togopi Limestone locally overlie the Miocene clastics indicating onset of very young shallowing and uplift that culminated in this area being emergent land today.

Limestones of any age are a rarity onshore North Borneo (Adams, 1970; Wilson *et al.*, 1999; Wilson, 2002; Wannier, 2009). The range of shallow, some reefal and deeper marine carbonates with or without associated clastic influx in the Sabah Basin mirror the range of modern carbonates found offshore Borneo today. These include isolated buildups, such as Sipadan famed for its pristine reefs and abundant marine life. Less well known, but no less important, are coastal carbonates that fringe the mainland or offshore islands, in which corals and reefs are often affected by terrestrial runoff (Wilson *et al.*, 1999; Wilson, 2005). If work on nearby mapping quadrangles is considered (Wilson, 1964; Collenette, 1965; Balaguru and Nichols, 2004), there is little doubt that the mid-Oligocene to basal Miocene includes an acme of shallow marine carbonates in a generally very deep marine, but obviously changing, basin. This leads to a question of what geological change allowed shallow marine carbonates to develop within, or adjacent to, a long-standing, very deep marine basin? An exceptional sea-level fall might be argued to lead to exceptional amounts of down-slope transport. However the in-situ limestone in the Upper Labang and overlying Gomantong Limestone described here were clearly formed in shallow marine conditions over beds deposited in many hundreds of metres water depth, and the identification of the probable unconformity detailed in this study points most strongly to a tectonic cause

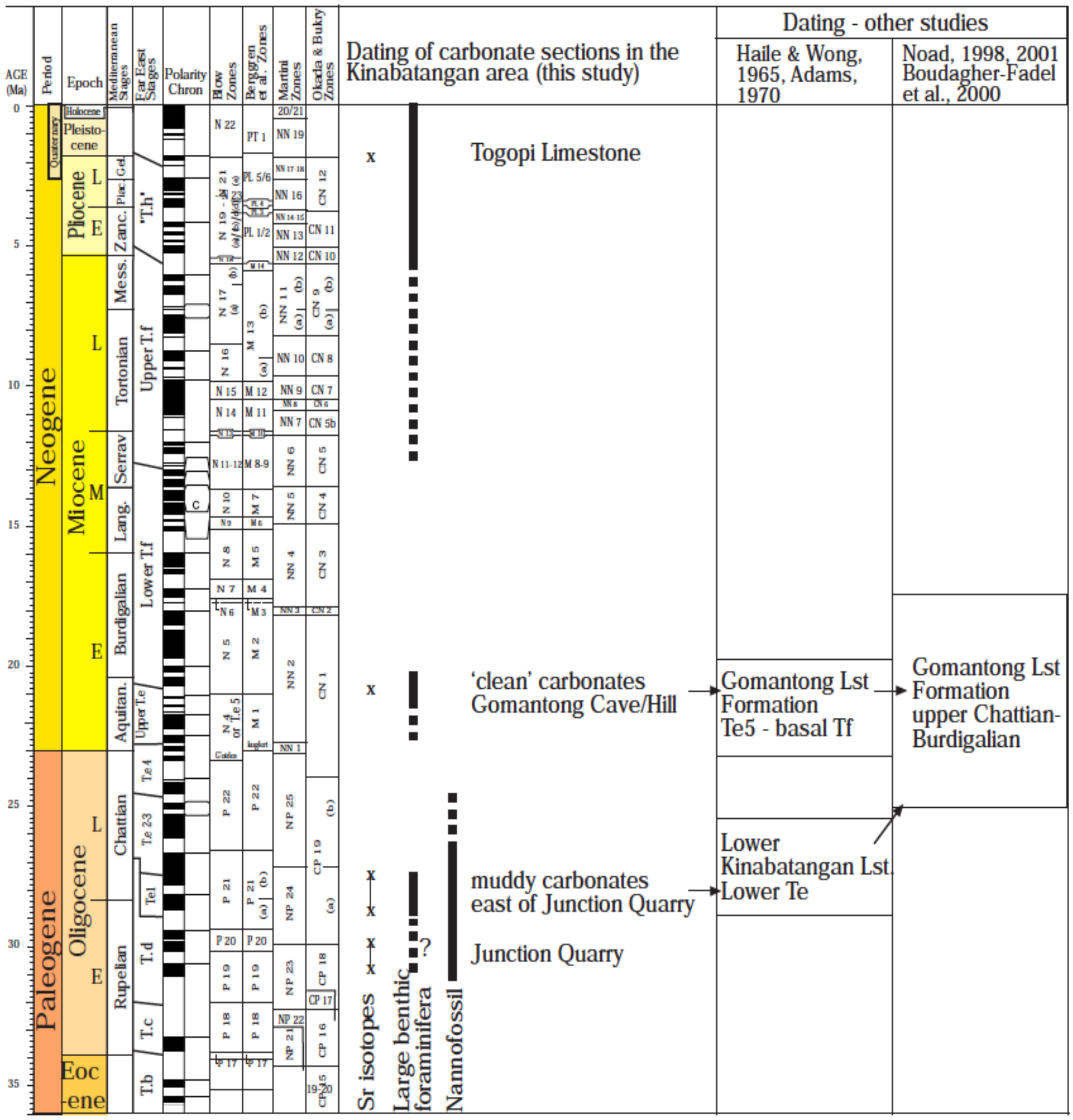

Figure 3. Strontium isotope, larger benthic foraminifera and nannofossil age assignment (this study) correlated to standard biozones, the global eustatic curve and the absolute age scale (after Haq et al., 1987; Gradstein et al., 2004; Lunt and Allen, 2004). Age assignment of previous workers for carbonates in the Kinabatangan area is shown on the right (Haile and Wong, 1965; Adams, 1970; Noad, 1998; Boudagher-Fadel et al., 2000a; Noad, 2001). Arrows between the different studies show comparable deposits. Note closely comparable results between this study and British Borneo Survey Results (Haile and Wong, 1965; Adams, 1970).

for basin change. This paper therefore begins to address the question of how does the timing of carbonate development in the Kinabatangan area compare with western Borneo (Wilson *et al.*, 1999; Wannier, 2009), and what might this reveal about the tectonic and sedimentological evolution of the area?

2.5: Previous work on dating of carbonates in the Kinabatangan area

Oligo-Miocene reef limestones were originally described from the lower Kinabatangan area, where they were variously dated as Td-f, Te-f and Te2-5 (Reinhard and Wenk, 1951; Fitch, 1958), with those from the lower Kinabatangan River as Te5 (Fitch, 1958; see figure 3 for ages of foraminiferal stratigraphy zones (Td,Te etc.)). Haile and Wong (1965) subdivided the carbonates of the Kinabatangan area into two groups on the basis of larger benthic foraminifera determinations by Geoff Adams (Fig. 3). They defined the 'Gomantong Limestone Formation' as a compact, crystalline limestone with the type section as the east face of Gomantong Hill. The description is of 'a thousand feet of limestone in a synclinal outlier in an area dominated by clastics'. Adams stressed an Early Miocene age (Te5) for the Gomantong Limestone Formation on the basis of abundant *Lepidocyclina (Nephrolepidina)* spp., less common *Eulepidina*, together with *Miogypsina sp.*, but lacking *Heterostegina borneensis* (in Haile and Wong, 1965). Adams suggested that 'the upper part' of the limestone lies close to, or actually straddles, the Te/Tf boundary with *Flosculinella globosa* (Rutten) and *Pseudotaberina* cf. *vandervlerki* (de Neve, after Renema, 2008) restricted to the uppermost beds that lack the index form *Eulepidina*, which was common in the beds below. Haile and Wong (1965) state for the basal boundary of the Limestone that it "*apparently overlies the Labang Formation unconformably, although the* *boundary may well be faulted. ... Wenk was certainly of the opinion that the basal boundary of the Gomantong Limestone is an unconformity, and this is confirmed by the sharp break in fauna between the Te5 and Te1–4 limestones with no transitional types being known.*" Note that at the time of Adam's work, the old subdivisions Te1 to Te4 had been combined as a single "Te1–4" unit. It is only recently that Lunt and Allan (2004) have re-established Te1, Te2–3 and Te4 as practical divisions from mid- through later Oligocene times, via new strontium dating and by building on the unpublished work of Muhar (1956).

The muddy carbonates now outcropping along the Sukau Road were considered to be a member of the Labang Formation and defined as the Lower Kinabatangan Limestone (Fig. 3; Haile and Wong, 1965; Adams, 1970). These Lower Kinabatangan Limestones were dated as Lower Te (Te1–4 or Late Oligocene, Adams, 1970). The fauna was rich in *Lepidocyclina (Eulepidina) formosa* and *Heterostegina borneensis*. A Late Oligocene (NP24) age was also obtained for calcareous mudstones rich in corals and larger foraminifera transitional to silt and sandstones from along the Sukau Road by Rangin *et al.* (1990b). An identical nannofossil assemblage (*Helicosphaera recta*, *Cyclicargolithus abisectus*, *Sphenolithus ciperoensis* and *Sphenolithus distensus*) was seen at Batu Puteh (Fig. 2) where small carbonate buildups interfinger with clastics (Rangin *et al.*, 1990b). Adams (1970) shows a distinct stratigraphic break at the end of the Late Oligocene between the Lower Kinabatangan Limestone and the Gomantong Limestone (Fig. 3), and although

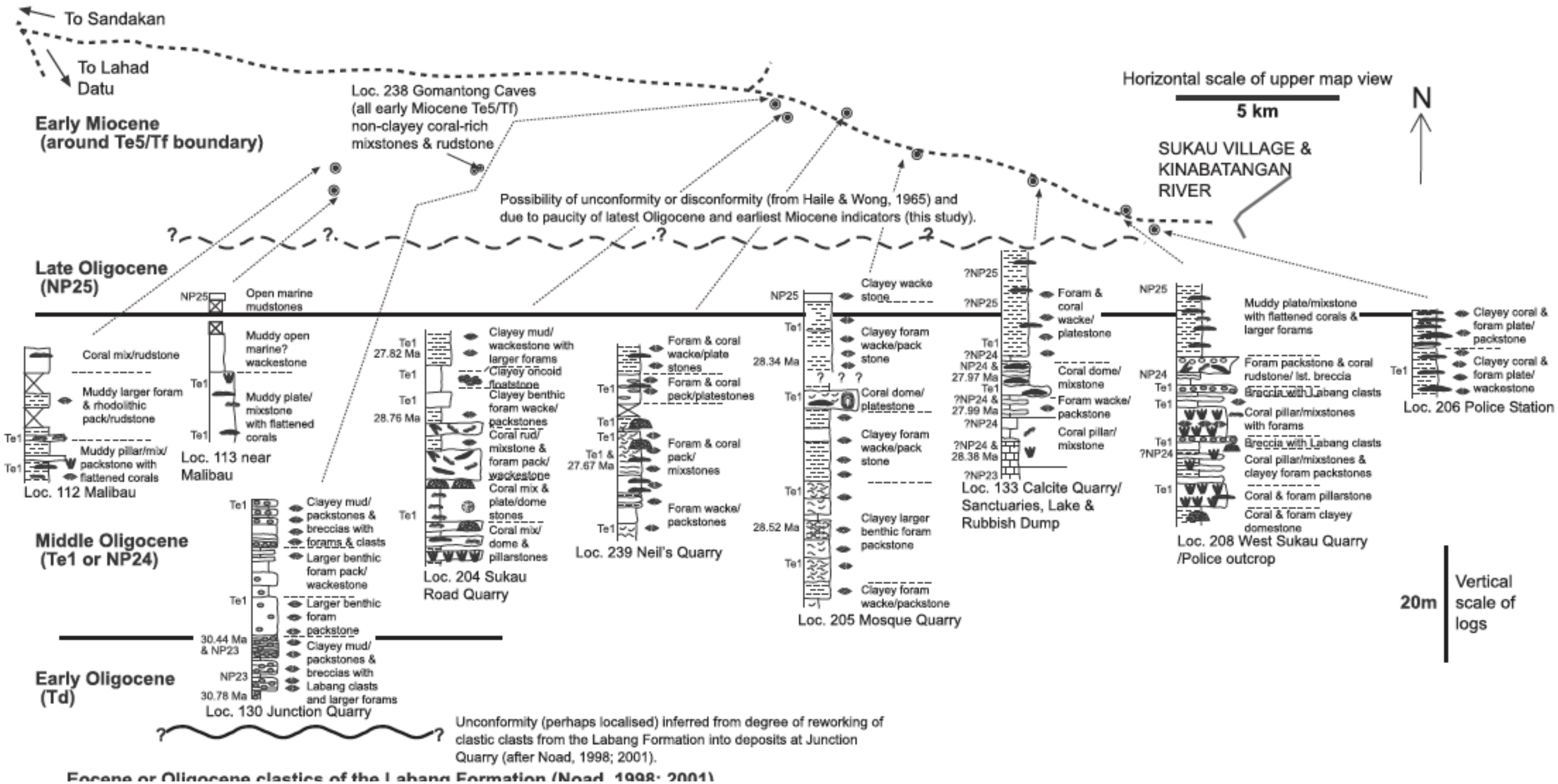

Figure 4. Measured sections or logs, their facies (after Noad, 1998, 2001) and age assignment of samples (this study) for muddy carbonates in the Kinabatangan area. Upper plan view shows locations of measured sections. Facies nomenclature is after Insalaco (1998).

further explanation was planned (Adams, 1970, and in Haile and Wong, 1965) this never transpired.

In retrospect the term “Gomantong Limestone Formation” might be considered a poor choice of name as a clastic “Gomantong Member”, also of Letter Stage Te age, had previously been defined on the Kudat Peninsula about 200 km to the west (cf. Liechti *et al.*, 1960). Notwithstanding this, the Gomantong Limestone Formation name has endured and Noad (1998, 2001) and Boudagher-Fadel *et al.* (2000a) apply this name to all Oligo-Miocene carbonates in the Kinabatangan area (Fig. 3). For the carbonates as a whole latest Oligocene to Lower Miocene ages were inferred (Noad, 1998; Boudagher-Fadel *et al.*, 2000a; Noad, 2001). Nannofossil analysis by Jeremy Young (quoted in Noad, 1998) yielded NP25 (Late Oligocene) dates for two muddy carbonates sites to the west of the Gomantong Caves (Global Quarry and one of the Sentosa Quarries: Noad, 1998). An NP25 age assignment was on the basis of *Sphenolithus ciperoensis* in the absence of *S. distensus* (Young, in Noad, 1998). However, Young is misquoted in later publications (Boudagher-Fadel *et al.*, 2000a, 2000b; Noad, 2001) and no diagnostic Early Miocene assemblages were found, definitive age dating was of NP25 only, not NP25-NN3. Larger benthic foraminifera yielded Late Oligocene (“Chattian”) to mainly Early Miocene (“Aquitanian to Burdigalian”) ages approximately equivalent to the Te interval (Boudagher-Fadel *et al.*, 2000a). However, Boudagher-Fadel *et al.* (2000a) group part of the Lower Te (Te1–4) stage with the “Aquitanian” (early Miocene) whereas other authors continue to place the whole Lower Te group in the Oligocene (Adams, 1970, 1984; Lunt and Allan, 2004). Noad (1998, 2001) and Boudagher-Fadel *et al.* (2000a) did not recognise an age break between the muddy carbonates along the Sukau Road and the indurated limestones at Gomantong. An unconformable, and locally syndepositional contact, was inferred between the muddy carbonates and clastics of the Labang Formation since reworked green Labang clasts are present at various levels within the carbonates (Noad, 1998; Boudagher-Fadel *et al.*, 2000a; Noad, 2001).

2.6: Methodology

2.6.1: Fieldwork, outcrops and sampling

The Kinabatangan area was selected as a region of fossiliferous deposits with good preservation of corals of Oligocene or Early Miocene age. Initial outcrop locations were pinpointed from earlier studies (Adams, 1965 and unpublished; Noad, 1998, 2001). Two field seasons in 2006 and 2007 were undertaken to make systematic collections of the coral faunas and sample for high resolution dating. Both sample sets were tied to previous and new stratigraphic measured sections (Fig. 4; after Noad, 1998, 2001). Rock and fossil samples collected are catalogued and housed at the Natural History Museum, London. Samples previously collected from the area by Jon Noad and Geoff Adams were also available for this study through the SE Asia Group Research Collection at Royal Holloway University of London and the Natural History Museum, London respectively.

Sampling concentrated on the muddy carbonate deposits exposed in small quarries and road cuts bordering the Sukau Road up to 15 km to the west of Sukau Village (Figs. 2 and 4). Exposures generally extended tens to hundreds of metres laterally along strike with up to a few tens of metres of stratal thickness. Corals with excellent preservation of surface features (but internally recrystallised) are found within these deposits. Regionally the carbonates form a 50 km long east-west trending belt (up to 15 km wide north to south) of localised carbonate hills extending between the Kinabatangan Estuary and the north-south trending Lahad Datu Road (Noad, 1998, 2001). The dips and strikes of strata are highly variable though commonly towards the north or south and between near horizontal to near vertical. There is considerable structural deformation with common folding, faulting, and overturning of some beds. Because of this it was difficult to place individual outcrops separated by no exposure in a stratigraphic context relative to each other. The Kinabatangan area is undergoing considerable change, with massive expansion of oil plantations, decreasing forest reserve areas, road and housing development. Due to this, and the carbonates commonly being used for road stone, many of the exposures that Adams or Noad studied are either no longer present or heavily altered. For example the Sukau Road Quarry of Noad was affected by a major landslide and is now almost completely covered in an oil palm plantation. The Police Station Outcrop and part of West Sukau Quarry of Noad have been infilled. Sanctuary Quarries (together with Lake and Rubbish Dump) and Police Outcrop of this study appear to be much altered versions of Calcite and West Sukau (plus Station Outcrop) Quarries, respectively (Noad, 1998, 2001). Measured sections, their facies (after Noad, 1998, 2001) and age assignments of samples (this study) are illustrated on Fig. 4. A full description of the facies and their environmental interpretation is not covered here as this has previously been documented by Noad (2001). The most westerly of the outcrops sampled in detail for this study was the Labang Clast, or Junction Quarry of Noad (1998, 2001). This contains abundant larger benthic foraminifera associated with green angular pebble-sized clasts of the Labang Formation in a muddy matrix, but no corals (Noad, 1998, 2001). The other quarries between Sukau Village and Junction Quarry are rich in corals and larger benthic foraminifera in a muddy matrix. Abundant corals are present in the 300 m stratigraphic thickness of pure carbonates at the Gomantong Caves, 25km west of Sukau Village. Due to the indurated and recrystallised nature of the rocks at Gomantong Caves the corals at this site were unsuitable for systematic analysis, and detailed sampling during this study was not undertaken. Noad (1998, 2001) reported on small exposures of larger foraminifera and corals in muddy deposits to the west of the Gomantong Caves (Global, Western and Sentosa Quarries), but these deposits were not encountered during this study.

2.6.2: Larger benthic foraminifera

Randomly orientated thin sections from previous studies were available for larger benthic foraminifera determinations (and diagenetic studies; Madden, 2008). A total of more than 100 thin sections were studied (42, 21 and 60 from John Noad, Robert Madden and the Geoff Adams collections, respectively). Larger benthic foraminifera determinations were by Peter Lunt and after Geoff Adams (unpublished notes). Age assignments were through comparison with the modified East India Letter Classification for larger benthic foraminifera (Van de Vlerk and Umbgrove, 1927; Adams, 1970; Lunt and Allan, 2004) correlated against the 2004 geological timescale of Gradstein *et al*.

2.6.3: Nannofossils

Friable clay-rich samples were collected from the top, base and sometimes middle of the muddy carbonate sections for nannofossil analysis. Strew mounts were prepared for light microscope analysis using standard techniques as described in Bown and Young (1998). The slides were analysed on a Zeiss Axoiplan photomicroscope at x1600 magnification using cross-polarised light and phase contrast illumination. Selected specimens were imaged using an attached Leica Firecam digital camera. Species identification was primarily based on Perch-Nielsen (1985), Varol (1998) and Young (1998). Zonal assignments use the standard nannofossil zonation of Martini (1971).

2.6.4: Strontium isotope analysis

Thirteen samples were selected from the base and/or top of key measured sections to allow age dating through comparison with the previously derived strontium isotope seawater curve for the Cenozoic (Oslick *et al.*, 1994; Veizer *et al.*, 1999; McArthur *et al.*, 2001; McArthur and Howarth, 2004). Samples were microdrilled from calcitic larger benthic foraminifera and limestone matrix (the latter just from the purer carbonate samples). Corals were not sampled since their original skeletal material was found to be diagenetically altered during petrographic examination. The surface of the foraminifera was removed using the microdrill and this fraction was discarded to avoid any potential contamination with clays from the matrix (which would result in elevated 87Sr/86Sr). The foraminifera were dissolved in dilute HNO3. Since the matrix samples may have included very minor clay content, precautions were taken to avoid analysing any non-carbonate material. These matrix samples were pre-leached in sufficient dilute acetic acid to dissolve a third of the mass, a second third was dissolved in the same manner, with just the latter fraction analysed. Strontium was separated from the solutions using Eichrom Sr-spec resin, and analysed on the Royal Holloway VG354 thermal ionisation mass spectrometer. Samples were loaded on single Re filaments with a Ta emitter, and run using the multidynamic procedure of Thirlwall (1991). The current value for SRM987 standard is 0.710247 ± 8 (2 sd, N = 15), consistent with the long-term mean of Thirlwall (1991), and the three standards analysed with the samples reported here are within error of this value.

2.7: Results of age dating

2.7.1: Larger benthic foraminifera

Petrographic analysis revealed that the skeletal material of all corals sampled is diagenetically altered, but the calcitic larger benthic foraminifera are well preserved. The age assignment based on the larger benthic foraminifera identified in thin section from all thin sections studied fall into three groups with clear distinctions between assemblages in all slides. At any one numbered location the results are the same, regardless of whether several thin sections cover different facies.

i) Jon Noad's locations 112, 113, 117, 119, 120, 130, 133, 204, 205, 206, 208, and 239 i.e. the muddy carbonates east of Junction Quarry, are from the base of the Late Oligocene, Te1 Letter Stage; roughly 27–28 Ma. This older group has common *Eulepidina*, *Heterostegina borneensis*, and *Neorotalia mecatepecensis*; but lack *Miogypsinoides* or *Miogypsina* (Fig. 5). Using the ranges of Geoff Adams (1970) [who did not place *N. mecatepecensis* in the larger foraminifera], the older group is Te1–4 on both the presence of the listed forms and the absence of *Miogypsina*. A tighter age assignment can be deduced here on the basis of evolutionary changes in species and their embryonic chambers. Muhar (1956) recognised that the evolution of *Heterostegina borneensis* (Fig. 4) to what we now call *Tansinhokella* (=primitive *Spiroclypeus*) defined the Te1 to Te2–3 boundary. He also recognised that what is now called *N. mecatepecensis* was the ancestor to *Miogypsinoides*, and that the evolution of this latter form defined the base of Te4. The abundant presence of *H. borneensis*, yet absence of the descendant, which initially shared the same niche, is significant in defining the basal Late Oligocene Te1 age in our samples. Similarly the common to abundant *N.*

mecatepecensis yet absence of the descendant *Miogypsinoides* indicates a pre- Te4 age for the older group of samples. Sections though the embryonic chambers of *Lepidocyclina* (*Nephrolepidina*) in this sample group are "Isolepidine" with nearly equal sized protoconchs and deuteroconch (first and second embryonic chambers). This is measured as the proportion of the common contact wall, which in this case averages about 30–35% (Fig. 5). This stage of *Lepidocyclina* evolution is restricted to mid-Oligocene specimens throughout SE Asia (after Van der Vlerk and Postuma, 1967, also reviewed as a stratigraphic method in Drooger, 1993 and Lunt and Allan, 2004). Friable samples from the lowermost part of Junction Quarry were not thin sectioned for larger benthic foraminifera analysis (Fig. 4) although there is the possibility these may range down into the Td Letter Stage (age diagnostic *Nummulites* if present would occur only rarely with very flat, elongate lower photic depth forms).

ii) Jon Noad's locations 125, 251, and 238, i.e. carbonates at Gomantong Hill and to the west, are Early Miocene close to the Te to Tf boundary, roughly 20–21 Ma. This group has common *Miogypsinoides* and *Miogypsina*, lack the Te1-4 restricted *Heterostegina borneensis* and *Neorotalia mecatepecensis*, and generally lack the Te5 (and older) marker *Eulepidina* (Fig. 6). In Geoff Adams collection, all samples from Gomantong Hill contained *Miogypsina*, *Miogypsinoides*, but lacked *Eulepidina* or *H. borneensis* and would be considered Lower Tf. A number of our samples (see below) contain *Eulepidina* and are therefore Te5 in age. A number of factors indicate that even though

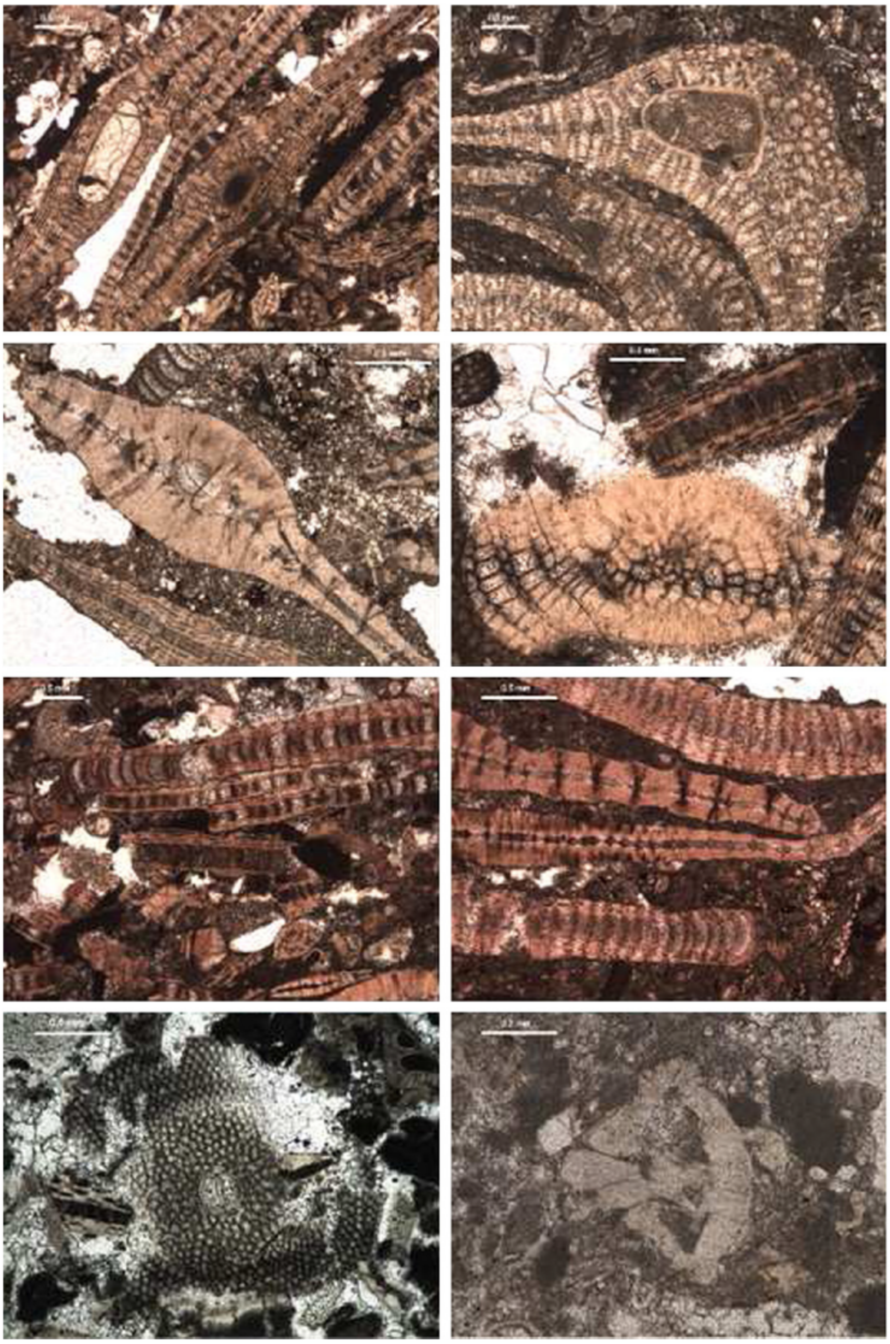

Figure 5. Photomicrographs of Oligocene muddy carbonates from the Lower Kinabatangan area showing *Eulepidina* (upper), *Heterostegina borneensis* (2nd row down), *Eulepidina*, *Neorotalia mecatepecensis* and *Heterostegina* (3rd row down). Lowermost row shows *Nephrolepidina* (isolepidine form) and close up of *Neorotalia mecatepecensis*. Samples are from top row (left) to bottom row (right): 206-66-2, 205-618-19, 206-66-3, 205-618-19, 130-63-2 and 239-620-14 (205 – Mosque Quarry, 206 – Sukau Road Quarry, 130 – Junction Quarry, 239 – Neil's Quarry, after Noad, 1998)

this second group of samples ranges into the Lower Tf, they must be right at the base of Lower Tf. The measured circumference of the common wall in the embryonic chambers of *Lepidocyclina* (*Nephrolepidina*) has increased to 40–45% and the deuteroconch is now recognisably larger than the protoconch (Fig. 6; after Van der Vlerk and Postuma, 1967, also Lunt and Allan, 2004, with strontium dating control). In the Miogypsinids the few embryonic chambers, where seen (such as Loc. 238, 620– 13) are consistent with very lowermost Tf1 (Lunt and Allan, 2004, after Raju, 1974 and others). The *Austrotrillina* in this second group (Gomantong Hill) have not reached the evolutionary stage where the alveolae in the thick sidewalls have become branched. Also the Lepidocyclinids are known to undergo evolutionary radiation in Lower Tf to very distinct forms such as *L. ferreroi*, *L. crucifera* and *L. radiata*, which are all identifiable in small fragments, in random thin section, yet are completely absent here. Although most Gomantong Hill samples are assigned to very lowermost Tf1 a number of the other samples from the Adams collection from the vicinity of the Gomantong area (J2711, 2713, 2714 and 2715) contain both *Eulepidina*, *Miogypsina* and/or *Miogypsinoides* and are assigned to Te5.

iii) “Togopi, Loc 286; 97J111/1” — This single slide is of a *Halimeda* packstone with very few foraminifera apart from three specimens of *Alveolinella quoyi*, (Fig. 7). These indicate an age in Upper Tf or younger, approximately latest Middle Miocene to Recent. A possible abraded *Calcarina* (Fig. 7) may narrow the age assignment down to latest Miocene to Recent.

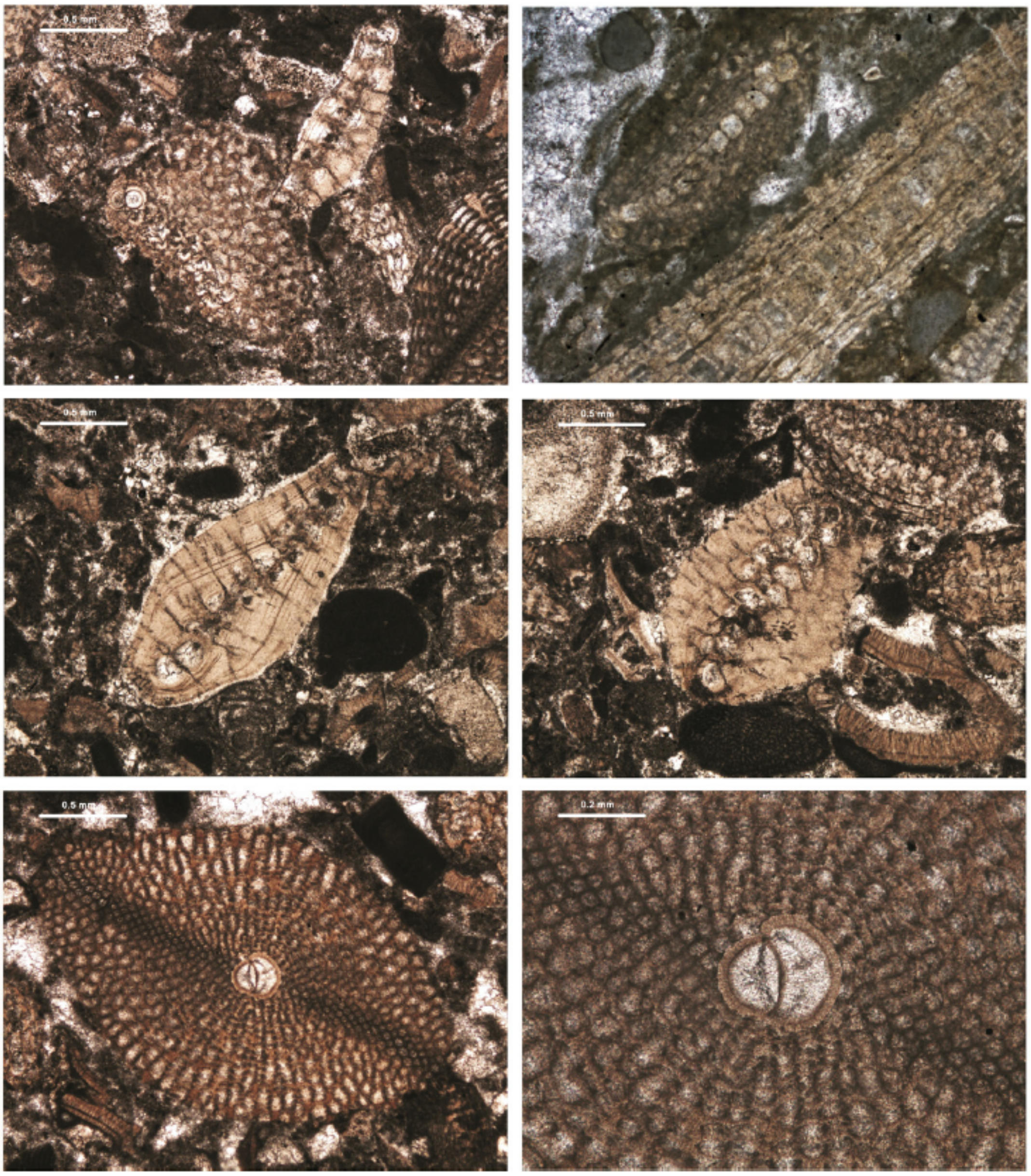

Figure 6. Photomicrographs of Early Miocene samples from the Gomantong Caves area showing common *Miogypsina* (upper), *Myogypsinoides* (middle), but usually lacking *Eulepidina*, *Heterostegina borneensis* and *Neorotalia mecatepecensis*. Top right shows *Miogypsina* with *Eulepidina* from J2715 (Geoff Adam's locality), *Nephrolepidina* (lower) with close up of protoconch and deuteroconch. Samples: Top left and middle – 620-13, lower – 619-10.

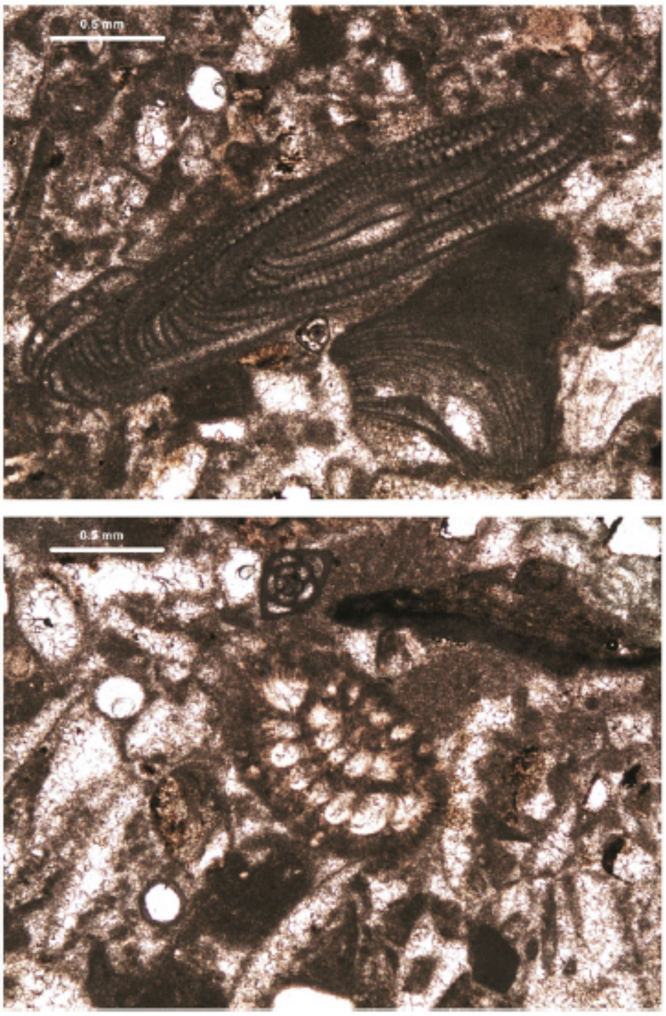

Figure 7. Photomicrographs of the Togopi Limestone, Loc 286: 97J111/1 (Noad, 1998). *Alveolinella quoyi* (upper) and abraded probable *Calcarina* (lower).

2.7.2: Nannofossil analyses

Nannofossils were present in most samples with variable preservation and abundance, as summarised in Table 1. Generally the samples with fewer nannofossils also had markedly worse preservation; hence the samples with common nannofossils are the most reliable and were studied more intensively.

All assemblages were broadly similar, low diversity assemblages with common *Cyclicargolithus floridanus*, *Coccolithus pelagicus*, and *Sphenolithus moriformis* (Fig. 8). Less abundant but consistently present species included *Cyclicargolithus abisectus*, *Discoaster deflandrei*, *Clausicoccus fenestratus*, *Coronocyclus nitescens* and small sphenoliths of the *Sphenolithus ciperoensis – distentus - predistentus* group. Infrequent species observed included *Helicosphaera compacta*, *H. recta*, *H. obliqua* and *H. intermedia*. This type of assemblage is diagnostic of the Oligocene (nannofossil zones NP23–25). An older age is very unlikely since distinctive common taxa such as *Reticulofenestra umbilicus* and *Coccolithus formosus* indicative of older sediments are absent. Likewise a younger (Miocene) age is extremely unlikely given the presence of the *Sphenolithus ciperoensis – distentus – predistentus* group and *Clausicoccus fenestratus* and the absence of typical Miocene species such as *Calcidiscus leptoporus*, *Umbilicosphaera*, *U. rotula* and *Helicosphaera carteri*.

Nannofossil biostratigraphy of the Oligocene is largely based on the *Sphenolithus ciperoensis – distentus – predistentus* lineage (see e.g. Perch-Nielsen, 1985; Huang, 1977; Blaj et al., 2010) and the following three events are usually used: first occurrence of *S. ciperoensis*; last occurrence of *S. distentus* and *S. predistentus*; last occurrence of *S. ciperoensis* (Fig. 8). More broadly NP23 is characterised by *S. predistentus* with much less common *S. distentus*; in NP24 *S. predistentus* is still usually the most common species but *S. distentus*, *S. ciperoensis* and intergrades occur; in NP25 only *S. ciperoensis* occurs. Most of the samples contained low-abundance poorly preserved

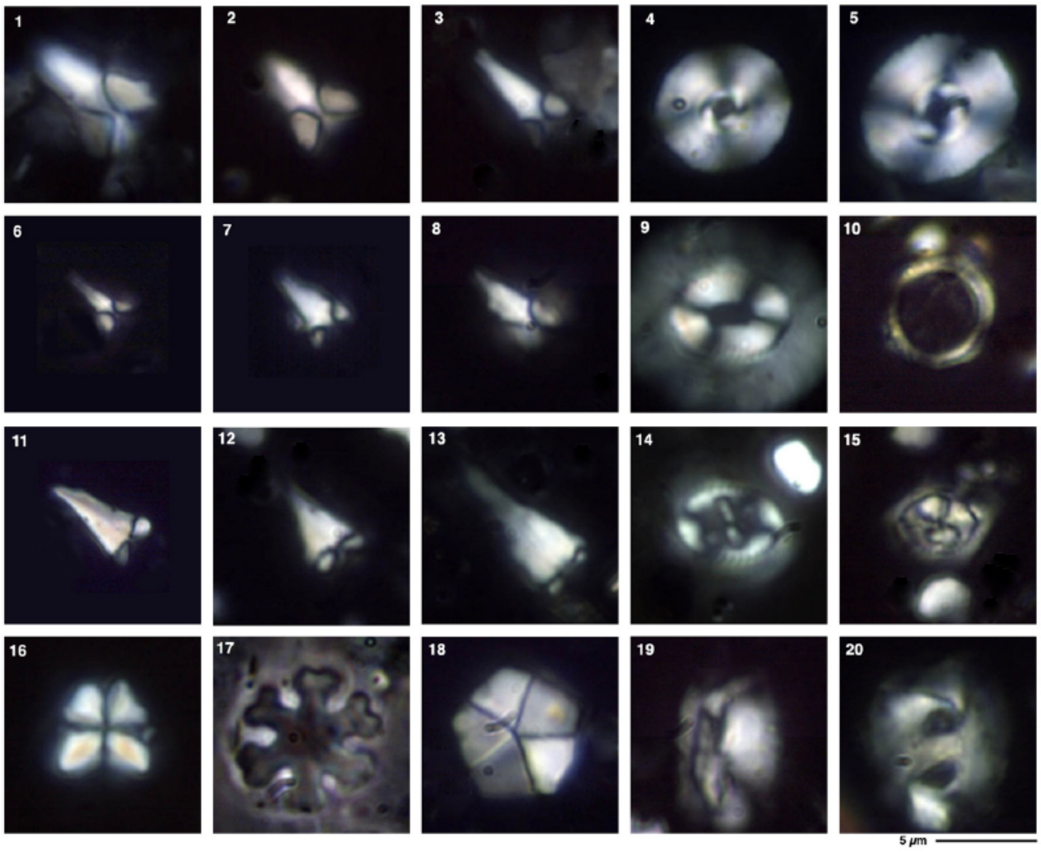

Figure 8. Light micrographs of representative nannofossil specimens. 1-3: *Sphenolithus ciperoensis*, all from sample PO 2. 4-5: *Cyclocargolithus floridanus*, both from sample LQ 1. 6-8: *S. distentus* from samples LQ 1, JQ 1 and PO 3 respectively. 9: *Coccolithus pelagicus*, from sample PO 3. 10: *Coronocyclus nitescens*, from sample MQ 1. 11-13: *S. predistentus*, all from sample JQ 2. 14: *Chiasmolithus* sp., from sample PO 2. 15: *Clausicoccus fenestratus*, from sample JQ 2. 16: *S. moriformis*, from sample PO 2. 17: *Discoaster deflandrei*, from sample Noad 121-1. 18: *Braarudosphaera bigelowii*, from sample Noad 1121-1. 19: *Helicosphaera obliqua*, from sample PO 2. 20: *H. recta*, from sample Noad 1121-1.

assemblages, which could only tentatively be assigned to individual zones. However, six of the samples contained better-preserved more-abundant nannofossils and these can be confidently dated. These include samples from NP23 (Junction Quarry 2), NP24 (Lake Quarry 1 and Police Outcrop 3) and NP25 (Police Outcrop 2, Mosque Quarry 1 and Rubbish Dump Quarry 1). This strongly indicates that a significant portion of the Oligocene is represented in the area.

2.7.3: Sr isotope analyses

The standard deviations for all samples analysed are acceptable and the 87Sr/86Sr of the 13 samples fall into four sets (Table 2). The oldest sample set is that from the basal part of the Junction or Labang Clast Quarry in which abundant larger benthic foraminifera are associated with lithic clasts (n = 3). 87Sr/86Sr values of 0.707957– 0.707983 correlate with an Early Oligocene age assignment of 30.78– 29.95 ± 0.28 Ma (after McArthur and Howarth, 2004; Luterbacher et al., 2004). The second and largest group is from the muddy carbonate quarries that are rich in corals and larger benthic foraminifera (n = 8; 0.708029–0.708072: Sukau Road, Mosque, Sanctuary, Lower Sanctuary and Neil's Quarry). With age determinations of 28.76–27.67± 0.26 Ma (after McArthur and Howarth, 2004) these fall around the Early to Late Oligocene boundary (28.45± 0.1 Ma) and within the Late Oligocene (Luterbacher et al., 2004). The one sample from the pure carbonates at the Gomantong Caves yielded an Early Miocene age (87Sr/86Sr ratio of 0.708387 equivalent to 20.97 ± 0.17 Ma: after McArthur and Howarth, 2004; Lourens et al., 2004). The sample of the Togopi Limestone (87Sr/86Sr ratio of 0.709094) was dated at 1.719 ± 0.075 Ma or Pleistocene (after McArthur and Howarth, 2004; Gibbard and van Kolfschoten, 2004).

Species/Locality	Junction Quarry 2	Junction Quarry 1	Sanctuary Quarry 1	Sanctuary Quarry 2	Lower Sanctuary 1	Lower Sanctuary 2	Lake Quarry 1	Lake Quarry 2	Police Outcrop 1	Police Outcrop 3	Police Outcrop 2	Mosque Quarry 2	Mosque Quarry 1	Lake Quarry	Rubbish Dump Quarry 1	Rubbish Dump Quarry 2	1121/1 (Noad)
Total abundance	C	F	R	R	F	F	C	F	F	C	C	R	C	F	C	R	C
Sphenolithus predistentus	F	r	r	r	r		r	r	r	r							
Sphenolithus distentus			r			r	r	r	r	r		r					
Sphenolithus ciperoensis				r	r	r	r	r	r	F	F	r	F	r	F	r	F
Sphenolithus moriformis	F	F	r	r	r	F	C	F	F	C	C	r	C	F	C	r	C
Cyclicargolithus floridanus (<11 μm)	C	F	r	r	F	F	C	F	F	C	C	r	C	F	C	r	C
Cyclicargolithus abisectus (>11 μm)			r				r	r	r				r		r	r	r
Coccolithus pelagicus	F	r	r	r	F	r	F	r	r	F	F	r	F	r	F	r	F
Coccolithus formosus		r															1
Claussicoccus fenestratus	r	r	r		r	r	r	r	r	r	F	r	r	r	r	r	r
Coroncyclus nitescens	r	r		r	r	r	r	r	r	F	r	r	F		r		F
Reticulofenestra minutus			r	r			r	r	r	r	r	r	r	r	r	r	r
Reticulofenestra umbilicus											r					r	
Reticulofenestra scissura	r	r					r	r		r	r		r	r	r	r	
Reticulofenestra dictyoda		r			r	r	r	r			r		r				
Micrantholithus sp.									r								
Chiasmolithus altus	r								r								
Discoaster barbadensis									r								
Discoaster deflandrei	r	r	r				r	r	r	r	r	r	r	r	r	r	r
Discoaster sp.				r	r	r				r							
Helicosphaera compacta	r									r		r	r				
Helicosphaera recta										r		r					r
Helicosphara obliqua										r	r						
Helicosphaera intermedia										r							
Nannofossil zone:	**NP23**	NP23?	NP23?	NP24?	NP24?	NP24?	**NP24**	NP24?	NP24?	**NP24**	**NP25**	NP24?	**NP25**	NP25?	**NP25**	NP25?	**NP25**

Abundance categories: C — Common (>1 per field of view). F — Frequent (1 per 1 to 10 fields of view). r — rare (<1 per 10 fields of view).

Table 1. Results of nannofossil analyses showing species recognised, and inferred nannofossil zones. First row gives overall nannofossil abundance. Assemblages with common nannofossils are highlighted in bold since they also have better preserved nannofossils, and so give much more reliable age data than those with rare or frequent nannofossils.

2.7.4: Summary of age dating results

There is excellent agreement between the age dating results from the three datasets (Fig. 3; larger benthic foraminifera, nannofossils and Sr isotopic analyses). Junction Quarry is the oldest section studied with nannofossil (NP23) and Sr isotope (30.78–29.95 Ma) results both yielding Early Oligocene ages. The larger benthic foraminifera in this section are consistent with lowermost Te (*Eulepidina* and *Heterostegina*), although there is the possibility of a Td Stage assignment for basal samples from this quarry that were not studied petrographically (*Nummulites* the marker for Td would only occur rarely with very flat elongate lower photic depth forms). Many of the rest of the muddy carbonates east of Junction Quarry all consistently date as straddling the Early to Late Oligocene boundary or Late Oligocene (Te1, NP24, Sr ages: 28.76–27.67 Ma). However, the Police Outcrop, Mosque Quarry and Rubbish Dump Quarry, as well as muddy carbonates west of Gomantong Hill range into the Late Oligocene (NP25). The crystalline limestone at Gomantong Hill and Caves is Early Miocene (Te5–Tf1 boundary, and Sr age: 20.97 Ma). The one sample of the Togopi Limestone is dated as Pleistocene (1.710 Ma), although a less constrained larger benthic foraminifera age was possible (Upper Tf, latest Middle Miocene to Recent or probably latest Miocene to Recent).

2.8: Discussion

2.8.1: Age interpretation and comparisons with previous work

Our age dating results for the carbonates in the Kinabatangan area generally show close correlation with the earlier results from the British Borneo surveys (Fig. 3; Adams, 1970, and in Haile and Wong, 1965). Utilising recent dating techniques (Sr isotopes), with close correlation between our three analyses types and through recent advances in correlation to absolute ages we have high confidence in our results. As with the earlier studies we assign the muddy carbonates east of the Gomantong Cave to the Oligocene (the Lower Kinabatangan Limestone of Haile and Wong, 1965 and Adams, 1970). Our results show that most of these deposits are earliest Late Oligocene, to spanning the Early to Late Oligocene boundary with at least one section ranging into the Early Oligocene (Junction Quarry). A number of the sections, including muddy carbonates to the east of Gomantong Hill, also range into the Late Oligocene on the basis of nannofossil results (here and Sentosa and Global Quarries by Young in Noad, 1998). This differs slightly from a middle Late Oligocene placement by Adams (1970), although this difference probably reflects the better present-day refinement of timescales, geological stages and absolute ages based on GTS04. In full agreement with the British Borneo work we assign the crystalline limestones at Gomantong (the Gomantong Limestone Formation of Haile and Wong, 1965; Adams, 1970) and to the east to an Early Miocene age with samples from around the Te5/Tf1 boundary as well as within Te5. Our data is also suggestive of a time gap in sedimentation with no larger benthic foraminifera or Sr age assignment from the latter part of the Late Oligocene (cf. Haile and Wong, 1965; Adams, 1970). However,

Sample number	Location	Sample	$^{87}Sr/^{86}Sr$	10^6 2SE	Age (McArthur 04)[a]
JQ5	Junction Quarry (base)	LBF	0.707957	12	30.78 ± 0.26 Ma
JQ1	Junction Quarry	LBF	0.707968	12	30.44 ± 0.28 Ma
63/11	Labang Clast (Junction) Quarry	LBF	0.707983	10	29.95 ± 0.27 Ma
64/24	Sukau Road Quarry (middle)	LBF	0.708029	10	28.76 ± 0.22 Ma
MQ3	Mosque Quarry (base)	LBF	0.708039	10	28.52 ± 0.20 Ma
SAQ3	Sanctuary Quarry (base)	LBF	0.708045	10	28.38 ± 0.19 Ma
MQ2-1	Mosque Quarry (middle)	LBF	0.708047	11	28.34 ± 0.23 Ma
SAQ1	Sanctuary Quarry (top)	LBF	0.708061	10	27.99 ± 0.23 Ma
LSA1	Lower Sanctuary Quarry	LBF	0.708062	11	27.97 ± 0.24 Ma
63/16	Sukau Road Quarry (top)	LBF	0.708067	12	27.82 ± 0.25 Ma
123/2	Neil's Quarry	LBF	0.708072	10	27.67 ± 0.26 Ma
619/23	Gomantong Caves	Matrix	0.708387	11	20.97 ± 0.17 Ma
TOGOPI	Togopi	Matrix	0.709094	9	1.719 ± 0.075 Ma
SRM987	N/A	Standard	0.710247	10	
SRM987	N/A	Standard	0.710248	9	
SRM987	N/A	Standard	0.710244	10	
Current mean SRM987			0.710247 ± 8		

Table 2. Results of Sr isotope analysis. Age assignment is after McArthur's Strontium Isotope Stratigraphy table: LOWESS Version 4-08/04 (after Howard & McArthur, 1997; McArthur et al., 2001; McArthur & Howarth, 2004. Errors in age assignment are from the look-up table and do not take into account the analytical results error for each sample.

nannofossil ages reveal that at least some sections range into the Late Oligocene (NP25). There is the possibility of any Oligocene gap in sedimentation extending into the earliest Early Miocene, although we would advocate a fuller study of the crystalline limestones at Gomantong to test this hypothesis. In general our identification of larger benthic foraminifera does not differ significantly from those in Boudagher-Fadel *et al.* (2000a). Where we differ from this work is in not placing some of the Lower Te division in the early Miocene. Restricting Lower Te to the Oligocene is consistent with a range of earlier studies (Adams, 1970, 1984; Boudagher-Fadel and Banner, 1999; Lunt and Allan, 2004). Indeed our additional nannofossil, Sr, evolutionary species change and morphometric studies support an Early to earliest Late Oligocene age for many of the muddy carbonates east of Gomantong. Our results are inconsistent with the predominantly Early Miocene age assignment for these same deposits (Boudagher-Fadel et al., 2000a) and do not support grouping these deposits within the (crystalline) Gomantong Limestone Formation (Noad, 1998; Boudagher-Fadel et al., 2000a; Noad, 2001).

2.8.2: Implications for the marine biodiversity hotspot and regional tectonics

Through a combination of detailed dating studies we confidently reassign the muddy carbonate deposits outcropping to the east of Gomantong Caves to the Oligocene (cf. Haile and Wong, 1965; Adams, 1970) rather than predominantly Early Miocene (Noad, 1998; Boudagher-Fadel *et al.*, 2000a; Noad, 2001). With a rich coral fauna (of approximately 100 morpho-species – 74 species are described in Chapter 3 in this work, the others are yet to be identified) from deposits now dated from on, or just after, the Early to Late Oligocene boundary we can now show that there were diverse coral assemblages back into the Late Oligocene. If other Oligocene biodiverse coral-rich sites are discovered this would have implications for extending the Indo-West Pacific Centre of Marine Diversity further back into deep time than was previously possible (i.e. by at least 5 million years from around the Oligo-Miocene boundary; Gerth, 1925; Umbgrove, 1930; Wilson and Rosen, 1998). These earlier workers pointed out a 'Paleogene Gap', or paucity in coral records from the Eocene and Oligocene, questioned whether this was real or due to sampling bias, but stressed the need for further new collections (Wilson and Rosen, 1998). This 'Paleogene Gap' was inferred to be real for the Eocene and Early Oligocene since although there were apparently suitable habitats, extensive coral-rich deposits are not well documented in SE Asia. Wilson and Rosen (1998) tentatively document signs of increasing coral richness from the mid-Oligocene and richer reef-coral faunas by the Late Oligocene to Early Miocene. Von Fritsch (1878) documented moderate coral diversity (20–25 species and genera) of likely mid Oligocene age (Td) in Kalimantan (see also notes in Wilson and Rosen, 1998). With reassignment of much of the Rajamandala Formation in Java from the early Miocene to the Late Oligocene (Lunt and Sugianto, 1996) there is now growing evidence of another diverse coral fauna of Late Oligocene age (Gerth, 1933). Together with this study, the data are indicative that any 'Paleogene Gap' in SE Asian coral diversity must pre-date the Early- Late Oligocene boundary. Alpha-diversity (number of genera at a given location) of corals in the Kinabatangan area is moderate. This is on the basis of 1562 fossil specimens sampled, representing about 100 possible species within 48 genera described (Chapters 3 and 4). However, detailed taxonomic studies are ongoing to ascertain how diversity compares with: (1) contemporary faunas, and (2) extant faunas (see Chapter 4 in this work). Such data is needed to further test the hypothesis that the age of the current centre of marine biodiversity can be extended back to the mid-Oligocene.

Our data and a review of published data correlated against refined zonation and absolute dating scheme indicates that carbonates developed predominantly during two main periods in the Kinabatangan Area (Fig. 3). These are: (1): around the Early to Late Oligocene boundary (Te1) to Late Oligocene (NP25), and (2) Early Miocene from Te5 to basal Tf1. The older muddy carbonates are interpreted as shallow reefal and associated deposits from coastal and shelf settings but always with significant siliciclastic influence (after Noad, 1998, 2001). There is considerable spatial and temporal facies variability during the middle Oligocene (Te1: Fig. 4) and a strong local environmental control is inferred on coral development (after Noad, 1998, 2001). In the field, detailed correlation between sections is not possible due to limited outcrop extent, lush tropical vegetation and structural complexity. Deposits appear to have developed through localised and opportunistic carbonate production perhaps similar to modern and other Cenozoic carbonate production around Borneo where siliciclastic influx was insufficient to swamp carbonate producing organisms (Tomascik *et al.*, 1997; Wilson *et al.*, 1999; Wilson and Lokier, 2002; Wilson, 2005). Carbonate production may have been promoted at this time due to tectonic uplift of an area that had long been a site of fully bathyal sedimentation. The mid-Oligocene eustatic sea-level fall of Vail and others (Vail et al., 1977; Haq et al., 1987) is estimated to have been in the order of 150 m. The muddy carbonate of the Kinabatangan area span much of the period of the mid Oligocene eustatic lowstand (Fig. 3) and shallow carbonate development may have been promoted by lowered sea level. However, the magnitude of this eustatic fall is insufficient to account for the change from fully bathyal to reefal conditions and does not account for the spatial variability in facies. With the possible exception of West Sukau Quarry (Noad, 2001), apart from localised faulting, there is no evidence for breaks in sedimentation and/or karstification in individual sections. The upper parts of the muddy carbonate sections that range into the Late Oligocene NP25 zone show possible evidence for deepening. These contain nannofossil-rich clayey deposits including generally low proportions of flat larger benthic foraminifera, and corals (Fig. 4). This possible deepening trend may be in response to a Late Oligocene eustatic sea level rise documented from within the NP25 zone (Fig. 3). Although locally a decrease in coral diversity is associated with this environmentally controlled Late Oligocene facies change, no inference about regional coral biodiversity can be drawn from this one area alone.

Haile and Wong (1965) note a contrast in structural dip between the Gomantong Hill limestone and underlying beds and suggest a significant unconformity, or a fault. To the west (Labuan and Padas area, Wilson, 1964), a distinct unconformity has been mapped between “Te1–4” deep marine mudstones with minor “lenses” of Te1 limestone (Pangi Limestone) and Te5 mudstones and biohermal limestones such as the Pulun Limestone. In 1962

Brondijk, working in the same area as Wilson, described folding and tilting associated with the unconformity between deep marine Te1 (?rare basal Te2–3) sediments that he re-named the Temburong Formation, and the overlying Setap Shales of Te5 age. The events of the latest Oligocene clearly need reconsideration on a regional basis.

Within Te5 times a transgression (Fig. 3) allowed the first clean biohermal limestones to be deposited, including the Gomantong Hill limestones. This may be correlatable to the succession in Sarawak, where interbedded clastics and limestones in the Subis-2 well assigned a general "Te1–4" age (Liechti *et al.*, 1960) pass up into clean biohermal limestones of Te5 age (Hutchison, 2005). The Te5 limestone is part of an extensive flood or transgression in the offshore Sarawak area (Petronas, 1999, and age dating PL in preparation). An unconformity, perhaps localised, has been inferred for the base of the Gomantong Limestone Formation (Haile and Wong, 1965), and there is evidence for both earlier and later tilting of strata and localised unconformities in the region (Adams, 1965; Clennell, 1996; Noad, 1998, 2001; Wannier, 2009). These may relate with phases of tectonism in foreland and then thrust-top wedge basins (Clennell, 1996; Wannier, 2009). However, dating on the timing of initiation and termination of the Gomantong limestone may correlate with plate tectonic changes in the South China Sea, specifically the start and finish of sea-floor spreading on the oceanic section facing Sabah which occurred shortly after 25 Ma – virtually on the Oligo-Miocene boundary – until 20.5 Ma (Barckhausen and Roeser, 2004). On- and offshore Sabah and Sarawak a number of authors have inferred, but not clearly dated, a major unconformity around the Oligo-Miocene boundary (Levell, 1987; Madon *et al.*, 1999; Petronas, 1999; Balaguru and Nichols, 2004). Palynology has demonstrated a regional change in climate from mostly seasonal to widely everwet conditions on the Oligo-Miocene boundary (Morley, 2000, dating revised Morley, 2008 pers. comm.). Wilson (2008) has postulated that this switch in the Early Miocene may result in more stable marine conditions and associated with lowered atmospheric CO2 levels may promote enhanced reefal development and formation of “pure” carbonate buildups.

2.9: Conclusions

A detailed, combined larger benthic foraminifera, nannofossil and strontium isotopic dating study of carbonates from the Kinabatangan region of Sabah, NE Borneo reveals that:

1) Muddy carbonates to the east of the Gomantong caves are Early and Late Oligocene (predominantly NP23–24, ranging into NP25, Te1 with Sr isotope ages 30.8–27.6 Ma). These deposits are synonymous with the Lower Kinabatangan Limestone of Haile and Wong (1965) although our new dating yields slightly older ages. Coral-rich deposits (~100 species) predominantly date from at, or just after, the Early to Late Oligocene boundary (NP24, Te1, Sr isotope ages of 28.8–27.6 Ma). On the basis of these new results we have confidence that diverse coral assemblages were already present by the middle of the Late Oligocene (around 5 million years older than previously documented). Implications for the origins of the Indo-West Pacific Centre of Marine biodiversity for corals are briefly discussed. The widespread carbonate production, albeit locally developed and affected by clastic influx, at the middle of the Oligocene and into the early part of the Late Oligocene may, in part, be in response to the mid-Oligocene fall and subsequent rise in eustatic sea level, but tectonism also had an influence.

2) The crystalline limestone at Gomantong Hill and Caves is Early Miocene (Te5–Tf1 boundary, into Te5 and Sr age: 20.97 Ma). This data is consistent with assigning the crystalline limestone and some of the carbonate to the east of Gomantong Hill to the Gomantong Limestone Formation as originally defined (Haile and Wong, 1965). Although some of the muddy carbonates to the East of Gomantong are Early Miocene we would not advocate grouping all carbonate formations in the Kinabatangan region into one formation. There is evidence for multiple, and some localised unconformities that separate carbonate and non-carbonate formations in the region. We concur with other authors that these are likely to reflect regional tectonic events that relate to rifting, seafloor spreading and accretion along the North Borneo margin.

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Chapter 3:

Coral Identification

Chapter 3: Coral Identification

3.1 Introduction

This chapter contains a list of identifications, descriptions and pictures of each of the species of scleractinian corals collected from the study area (Kinabatangan Region, N.E. Borneo). The study area is described in Chapter 1 and the dating of the localities makes up Chapter 2 of this work. Appendix 1 includes details for collecting sites, ages, and number of specimens found for each of these species groups. A previous collection from this area (Noad, 1998) yielded 27 genera, and other collections from the Oligocene of the IWP are detailed in Wilson and Rosen (1998: Table 3, p. 174). The most diverse of these collections is from the mid-Oligocene of Verbeek's Gamma Beds Formation, in Kalimantan (Indonesia): this area has yielded 23 genera and 25 species (von Fritsch, 1878; Gerth, 1931).

Presented here, is the largest systematic study on Late Oligocene corals from the Indo-West Pacific to date, including analysis of 1488 specimens collected from 8 different localities. Other organisms, such as echinoids, octocorals, bryozoans, and molluscs were found in conjunction with these corals and will hopefully be studied and identified in other works (e.g. Di Martino and Taylor, 2012). The accompanying echinoid fauna bears a striking morphological similarity to the co-eval fauna of Antigua (Prof. Stephen Donovan – *pers. comm.*), and among the specimens are members of the genus *Clypeaster* and spines of *Prionocidaris*, the Antiguan analogues of which are described and pictured in Dixon and Donovan (1998). The molluscan fauna found shows affinities to coral reef and sea grass habitats (Dr. Jonathan Todd - *pers. comm.*), however identification of these would be difficult given the present state of Paleogene Molluscan taxonomy.

The coral identification data gained here will be used in the next chapter to assess the alpha diversity and ecological similarity of all the localities studied, along with whether the taxa found are extinct or extant. The diversity of the area as a whole will also be compared to diversity data from the Caribbean (Johnson, unpublished data; 2008), in order to assess whether this time period (the Late Oligocene) was when the marine diversity hotspot in the Indo-West Pacific region began to flourish.

3.2 Materials and Methods

The new collections were obtained from the study areas detailed within Chapter 2 and Appendix 1. All specimens were collected by myself, and local assistants from Sukau village. Various sampling methods were used in an attempt to preserve information on the relative abundance of taxa. Most samples were collected during timed counts, where specimens were gathered by hand from the outcrop surface ground during a series of 10-minute time intervals and were kept together during shipment and processing. Field identification was rarely possible as the fossils were covered in a clay-sediment and required thorough cleaning before taxonomic detail could be seen. The only exception to this was at Lake Quarry where there was a water source present, allowing material to be cleaned and sorted into groups based on gross skeletal morphology; in this case, specimens from each morphological group found were labelled and kept for detailed identification in the UK.

In the lab at the NHM, fossil specimens were cleaned with water and a toothbrush, and also with an ultrasonic bath. They were then identified using hand lens and stereomicroscope. Dimensions of key morphological characters were measured using a set of Mitutoya Vernier Calipers, accurate to 0.02mm. Photographs of all specimens (presented in the plates at the end of this chapter) were taken either using the Axiocam equipment at the NHM, or by Phil Hurst (professional photographer at the NHM).

All species were sorted into morphological groups based on growth form, colony type, size and shape of corallites/calices, septal details, and any other distinguishing features. Microstructural details could not be studied, as they were not well preserved. The identifications and descriptions are based on one or more reference specimens from each of the morphological groups (reference specimen numbers are noted at the end of each description). Reference specimens were selected based on criteria that included preservation of key characters. This means that each group, as a whole, may have slightly larger ranges for the features measured, and that some unusual features may not have been recorded. The rest of the information presented here (i.e. the age and localities specimens were collected from) is based on the group as a whole.

Instead of comparison to type specimens, which was not possible due to the scope and resources available for this project, the identifications have been carried out using relevant publications from the available literature on coral taxonomy and systematics. The relevant references are noted with each description under “Identification reference(s):” (the complete references can be found in the Chapter 3 reference section of the Bibliography). The descriptions are arranged by genus, in alphabetical order. I have chosen not to arrange them by family due to the recent genetic works that have found many of the traditional taxonomic families to be polyphyletic (Fukami et al., 2008; Huang et al., 2009; Budd and Stolarski, 2011 and Huang et al., 2011), and also for ease of reference.

It should also be noted here that when looking at the species-level identifications in this chapter, that there may be some bias towards the recent, due to more detailed taxonomic references being available for recent species than for fossil species (e.g. Veron, 2000; Veron *et al.*, 1976-1984 (Scleractinia of Eastern Australia series)). However, for generic-level identification this bias is negligible, as specimens were compared to the generic descriptions in Wells (1956), and some were compared to the type- and other specimens of members of the relevant genera, held at the Natural History Museum, London, inclusive of both fossil and recent species.

3.3 Notes on Descriptive Terminology:

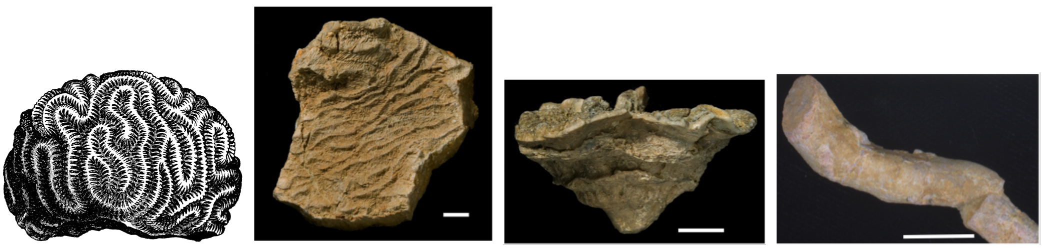
The skeletal terms used are as described in the glossary of Budd and Stolarski

(2011), with additional terminology from the glossaries of Rosen and Darrell (2010), Todd (2008) and Hill (1956) where appropriate. The following list is a short reference guide to how terms have been used in this work, and also gives the definitions of the measurements taken. Due to the overall poor preservation of these coral specimens, some features described in this work are uncertain and have been marked with a "?" at the start. Other uncertain features have been noted as "feature poorly preserved". Microstructural features were not observed in any of the specimens due to recrystallisation.

Colony structure (scale bars = 1cm unless otherwise stated):

Colony form: overall shape of the corallum, e.g. massive, platy solitary, branching etc.

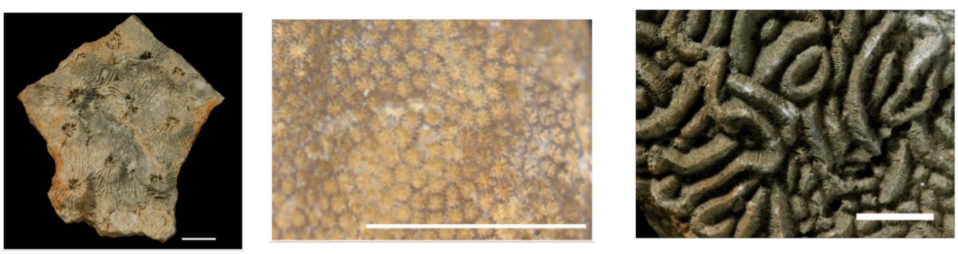
Figure 1. Colony form examples.



etc.

Colony type: the structure of the corallites present on the corallum surface, e.g. plocoid, cerioid, meandroid etc.

Figure 2. Colony type examples.



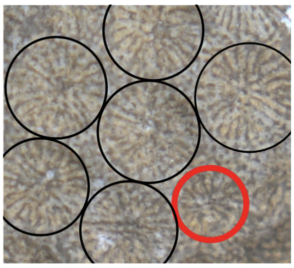
etc.

Underside of corallum: the opposite side to that with the calices.

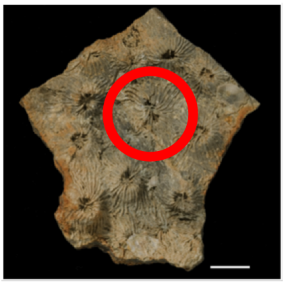
Figure 3. Underside of specimen.

Intra- and extramural budding: extramural budding is assumed if there are very small corallites on their own, next to much larger ones (Fig 4, a); intramural budding is assumed if two corallites are preserved in the process of splitting apart, or are very close to one another and are both about half the size of nearby corallites (Fig. 4, b).

Figure 4. Extra and Intramural budding examples.



a.



b.

Coenosteum: Upper surface of the corallum, found between septocostae or corallites.

Figure 5. Part of coenosteum circled in red.

Branch diameter: measured across the widest point of the branch.

Figure 6. Showing branch diameter.

Plate thickness: measured at the thinnest and widest parts around the exposed edge of the specimen.

Figure 7. Showing Plate thickness measurements.

N.B. All diameter measurements were measured at the widest part of the feature, unless a range is given.

Calice structure:

Calice: Central part of the corallite contains the septa and columella and is separated from the rest of the corallum by a wall; considered exsert, if the walls are raised above the coenosteum.

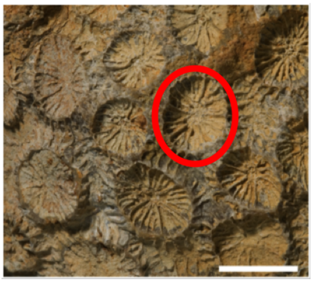


Figure 8. Showing a single calice (circled in red).

Calice centre: generally regarded as the mid-point of the columella, unless no columella is present, in which case it is the central point of the calice.

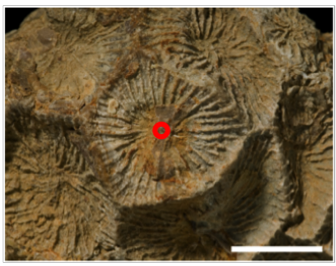


Figure 9. Showing position of calice centre.

Corallite: The structure containing the septa and columella inclusive of the wall and any exterior ornamentation.

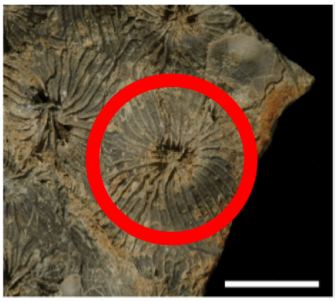


Figure 10. Showing a single corallite.

Columella structure: have used spongy rather than trabecular (see Stolarski 2003 Acta Palaeont. Polonica).

Figure 11. Showing a spongy columella.

Monticules: small sections of wall completely surrounded by septa. Can be round, polygonal or elongated (after Bosellini, 1999).

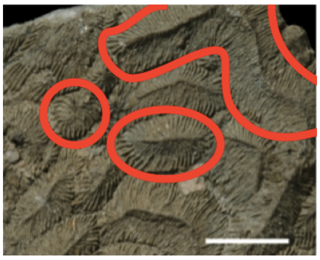


Figure 12. Showing round, polygonal and elongated monticules.

Walls: part of the corallum that separates calices from the rest of the coenosteum.

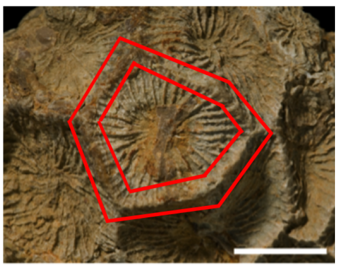


Figure 13. Showing wall structure (between red polygons).

Valleys: considered to be the area between two walls or monticules, with the valley centre being the lowest point approximately halfway between two walls/monticules.

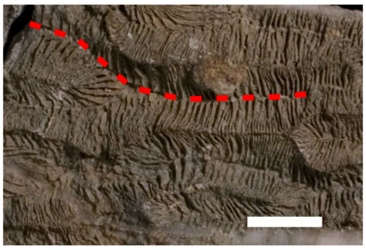
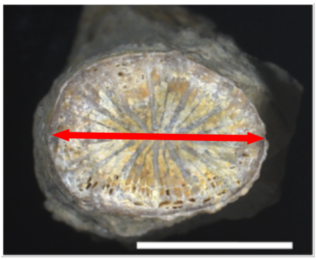


Figure 14. Showing the path of a valley (red dashed line).

Calice/Monticule diameters: measured from wall to wall, crossing over at least one centre, at the widest part of the calice (Fig 15, a), or from valley to valley across the centre, at the widest diameter of the monticule (Fig 15, b).

Figure 15. Calice and monticule diameter measurements.

a. 

b. 

Corallite spacing: measured from calice centre to adjacent calice centre.

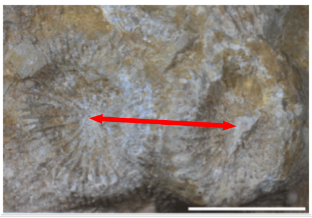


Figure 16. Showing measurement of corallite spacing.

Valley width: measured from valley centre to adjacent valley centre.

Figure 17. Showing measurement of valley width.

Valley depth: measured from lowest point in valley centre to highest point on an adjacent wall.

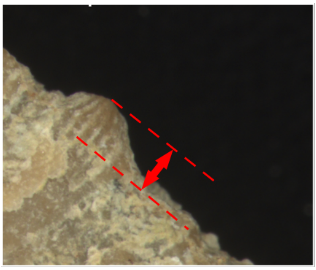
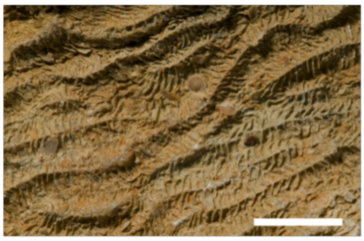


Figure 18. Showing measurement of valley depth.

Valleys: considered continuous if they are not closed-off by wall at both ends.

Figure 19. Showing discontinuous (a) and continuous (b) valleys.

a.  b. 

Septal structures:

Septal orders: distinguished by the relative length of the septa, i.e. all those septa that are a similar size belong to one order; septal orders are of the following relative sizes, in descending order: large (L), medium (M), small (S), very small (v. S), and tiny (T).

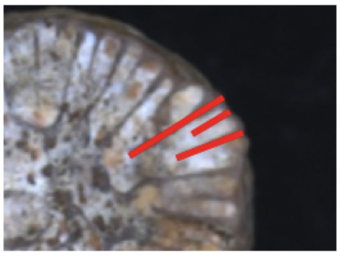


Figure 20. Showing large, medium and small orders of septa.

Distal septal margins: regarded as being the outward-facing, upper edges of the septa; the distal septal margins of many of the corals studied have been described as “uneven”. This is likely due to the margins having teeth, which have been broken-off or dissolved during diagenesis, leaving an uneven surface.

Figure 21. Distal septal margin (circled in red).

Septal faces: are the flat sides of the septa, which extend from the distal septal margins downwards into the calice.

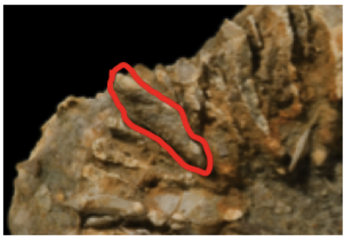


Figure 22. Part of septal face (outlined in red).

Septo-costae: extensions of the septa found outside of the calice wall.

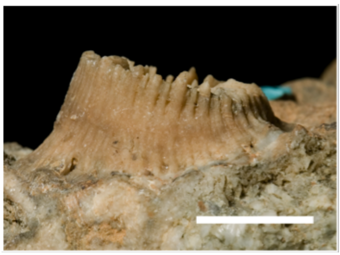


Figure 23. Septo-costae extending down outside of calice.

Costae: are small ridges on the underside of the coral that are analogous to septo-costae on the upper surface.

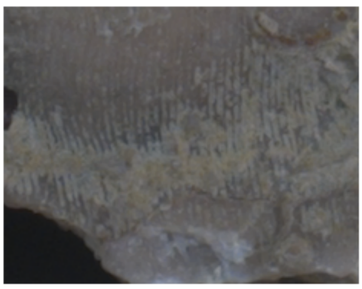


Figure 24. Costae present on underside of specimen.

Lamellar/Trabecular linkages: structures that resemble septa but are not attached to a wall at either end; they often extend at 90° to the direction of the septa.

Figure 25. Lamellar/trabecular linkage (circled in red).

Septa: considered exsert if they protrude above the walls of the calice or valley.

Figure 26. Exsert septa (circled in red).

3.4 Specimen Identifications

The taxonomic descriptions are recorded in the following manner:

Name and author, description, remarks (any notes on the identification given), number of specimens collected, and reference specimen ID numbers. Open nomenclature has been used for many of the descriptions, and follows the recommendations of Bengtson (1988). I have used "cf." if the species group is likely to be correct, but comparison to the type specimen is needed to confirm the ID, as the specimen does not exhibit all of the features needed for confident attribution. I have used "aff." to signify that the species shows an affinity to a particular species group, but is thought to belong to an unidentified species; and I have used a "?" before an identification to imply uncertainty (where this is the case it has been elaborated on in the "Remarks:" section for that species).

The reason that so many of the species here are in open nomenclature is the overall poor preservation of the coral fossils. The original aragonite has been replaced by calcite in all cases, and much of the finer detail of the skeletons has been lost. Septal numbers and patterns should be treated with caution, as it is possible that other, much thinner septa were once present and have been dissolved during diagenesis. This is also true of other delicate skeletal features such as septal teeth and paliform lobes, which also have been broken off in many of the specimens. Identifications made from groups with only one specimen found should also be treated with caution, as many of the specimens are only a broken piece of the original coral. Finding larger specimens, better preserved specimens and using averages from all specimens within a species group (in future work) may change the values of the features described here, so the identifications given here should be regarded as preliminary. Family names are not included for the reasons given in section 3.2. For all of the following photographs in this chapter, white scale bars = 1cm and blue scale bars = 0.5 cm.

SYSTEMATIC PALAEONTOLOGY

Phylum: ***Cnidaria*** Hatschek, 1888

Class: ***Anthozoa*** Ehrenberg, 1834

Subclass: ***Zoantharia*** de Blainville, 1830

Order: ***Scleractinia*** Bourne 1900

Acropora aff. *bushyensis* Veron and Wallace, 1984

(Figs. 27 and 28.)

Identification Reference(s):

Veron and Wallace, 1984. pp. 187-190, figs. 438-445. Specimens pictured are the holotype (stored at the Queensland Museum, Australia) and the paratypes (from both the Natural History Museum, London and the Australian Institute of Marine Science). All specimens were collected from Bushy Island – Redbill Reef, Eastern Australia (all were living specimens when collected).

Description: Branching/ramose colony form. Colony type: plocoid. No columella. Twelve septa per corallite (feature poorly preserved). Septal spacing: 3-4 per mm. One order of septa only. Septal lengths: All preserved septa reach approximately halfway towards calice centre. Septal faces not preserved well (sediment infilling calice). Distal septal margins not visible. Septo-costae: approximately 5 per mm. Septo-costae extend down outside of corallite wall. Calice diameter range: 0.8-1.3 mm. Calices: exsert to approximately 1mm. Corallite spacing: 2.4-5.6 mm. Extramural budding. Coenosteum: porous. Axial corallite at tip of branch larger than other corallites = 1.6 mm diameter (average = approximately 1.0 mm). Branch diameter: 17.1 mm at widest point. Branch tapers towards tip.

Remarks: I have allied this specimen group to the genus *Acropora* because it is the correct scale, it shows the typical “staghorn” branching shape, a porous skeleton and no columella present within the calices. There also appears to be a large axial corallite present in the reference specimen, which is diagnostic of the genus, along with the absence of the columella. The reference specimen shows similarities to *Acropora aspera* (Dana, 1846) and also *Acropora duncani* (Reuss, 1867) in the Gerth Collection (Leloux and Renema, 2007; pl. 23, figs 9-12), as it has same septo-costae on outside of corallites. I have allied it with the species *Acropora bushyensis* Veron and Wallace, 1984, because the species also has septo-costae on the outside of the corallites and is more similar in structure and scale, including the slightly uneven spacing of the corallites, although the corallites appear more widely spaced in this specimen than in the present day species (which is depicted in Veron and Wallace, 1984). This specimen appears likely to be a member of the *Acropora lovelli* group Veron and Wallace, 1984, as it shows most structural similarities to members of this group.

Specimens: Five specimens collected. Reference specimen: SaQ1: 52. (BMNH no. AZ8666)

Figure 27: *Acropora* aff. *bushyensis* – close up of corallites.

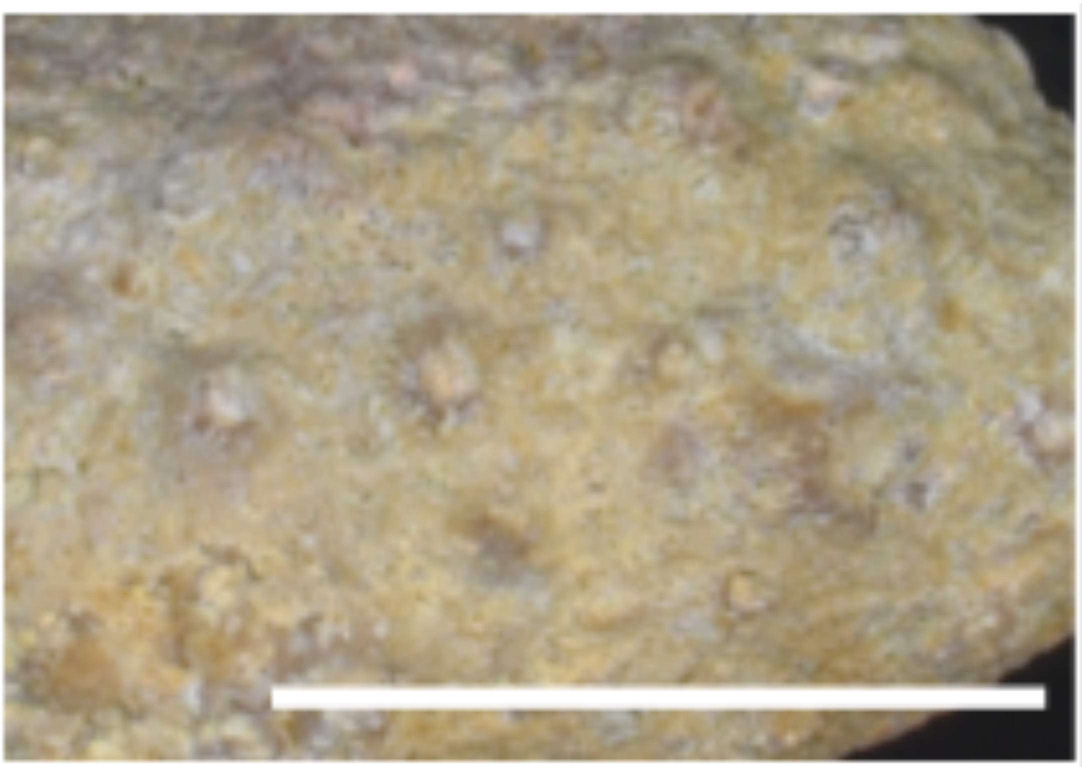
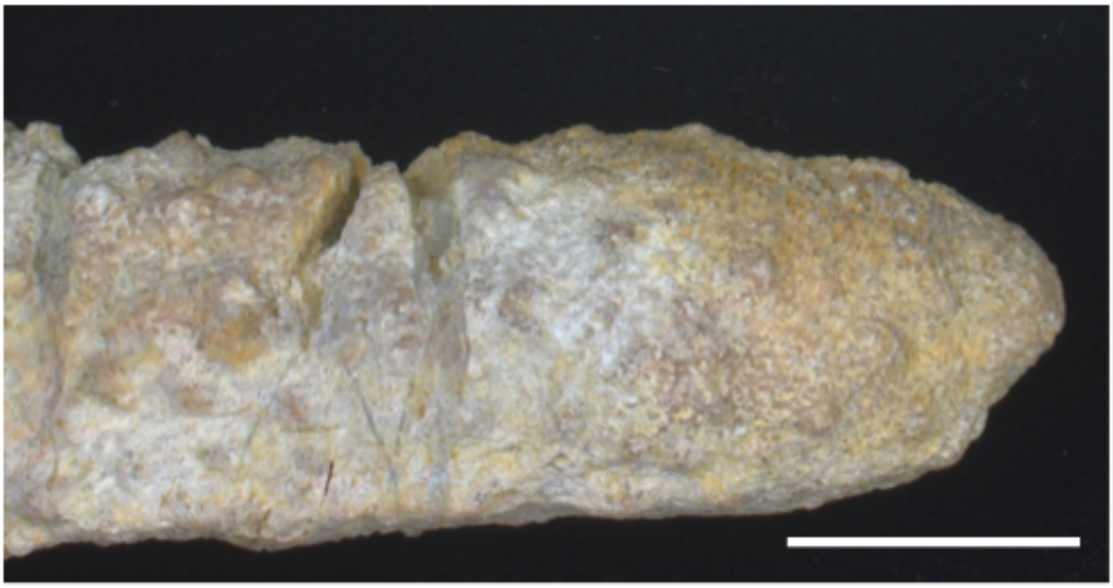


Figure 28: *Acropora* aff. *bushyensis* – end of branch.



Actinacis cf. *rollei* Reuss, 1864

(Figs. 29 and 30.)

Identification Reference(s):

Bosellini and Russo, 1995. pp. 220-223, pl. 2, fig. 1-6; pl. 3, fig 1. Specimens pictured are IPUM 24924 - IPUM 24925 (pl. 2 figs 1-6), and IPUM 24927 (pl. 3, fig. 1), collected from various Oligocene fossil locations around Italy.

Description: Columnar/branching/ramose colony form. Colony type: plocoid. Columella: spongy. Approximately 15-18 septa per corallite. Septal spacing: approximately 5 per mm. Three orders of septa (feature poorly preserved): large, small, medium, small, medium, large etc. (= average pattern). Septa: not exsert. Septal lengths: reach approximately 4.4 mm from calice centre. Distal septal margins: bumpy (have porous structure), with 2-4 bumps along each margin. Septal faces not seen (sediment infilling calice). Calice diameters: approximately 1.3-1.8 mm. Single synapticular ring around calice.

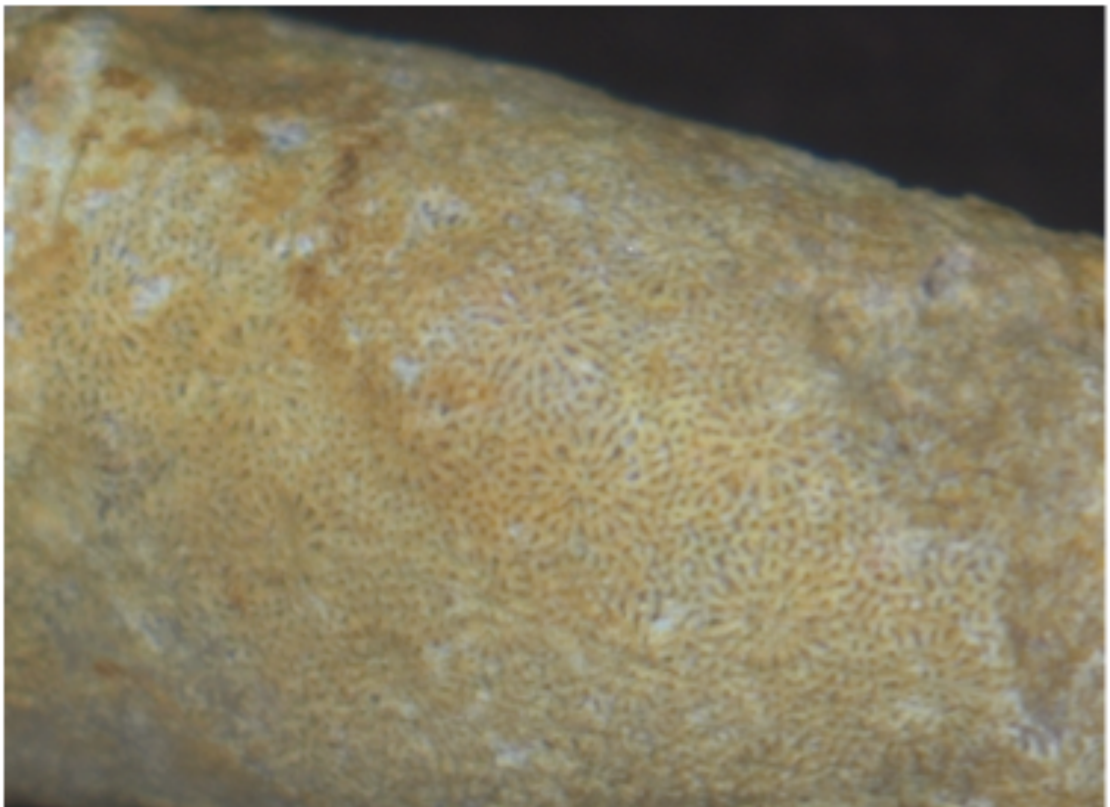
Corallite spacing: approximately 2.0-2.5 mm. Extramural budding. Coenosteum: porous. Tabular dissepiments: both exo- and endo-thecal; have porous structure. Branch diameters: approximately 17.2-66.1 mm (measured from 2 specimens). Porous structure of corallum: much finer than in *Goniopora* or *Porites*.

Remarks: This specimen has been identified as belonging to the genus *Actinacis* as it has a porous skeletal structure and has the same septal and corallite structures (see above description) as the species described and pictured in Bosellini and Russo (1995). This specimen group most closely resembles the species *Actinacis rollei* in Bosellini and Russo (1995). It shares the same characters as those described for *A. rollei*, however the corallite shape is more oval in this specimen group, rather than circular and the corallites are slightly larger. I have designated this group *Actinacis* cf. *rollei*, until comparison to type specimens confirms or refutes this identification. It should also be noted that the reference specimen used here has a branching growth form, but platy growth forms were also found within the study area and are believed to be of the same species because *Actinacis rollei* is thought to exhibit both growth form morphologies (Bosellini and Russo, 1995).

Specimens: Seventy-eight specimens collected. Reference specimen: SaQ: 102 (BMNH no. AZ8632).

Figure 29: *Actinacis* cf. *rollei* – branching morphology.

Figure 30: *Actinacis* cf. *rollei* – close up of corallites.



Actinastrea minutissima (Gerth, 1921)

(Figs. 31 and 32.)

Identification Reference(s):

Leloux and Renema, 2007. p. 22, pl. 24, figs. 6-9 Figured specimen (figs 6 & 7) is the Holotype (RGM.3868); Gerth, 1923. p. 94, pl. 7, figs. 3, 4 is specimen RGM. 43105; it is also pictured in figs. 8 & 9 in Leloux and Renema (2007).

Description: Columnar/branching/ramose colony form. Colony type: cerioid. Columella: styliform. Twelve septa per corallite. Septal spacing: 4-5 per mm. Septa: slightly exsert. Two orders of septa: large, small, large, small etc. (smaller septa are same length as larger ones, but are not as exsert). Septal lengths: All orders reach approximately 1/2 - 2/3 to centre of calice. Distal septal margins: smooth? (feature poorly preserved). Septal faces: smooth (feature poorly preserved). Calice diameters: 0.6-1.1 mm. Corallite spacing: 0.7-1.1 mm. Calices are minute and tightly packed on corallum. Extramural Budding. Intra- and extra-calicular, tabular dissepiments present. Branch/column diameter: 16.0-63.0 mm (branches are wider in one direction: cross-section is oval not circular). Branch/column has more than one rounded tip.

Remarks: This specimen group has been attributed to the genus *Actinastrea* because of the small size of the corallites, the styliform columella, the number and arrangement of septa, and the overall colony form (see above description). It is identical to the *Actinastrea minutissima* specimens pictured in the references studied (Leloux and Renema, 2007; Gerth, 1923), which are inclusive of the holotype, so I am confident of this species identification.

Specimens: Twenty-five specimens collected. Reference specimen: 1.9.380 (BMNH no. AZ7728).

Figure 31: *Actinastrea minutissima* - close up of corallites.

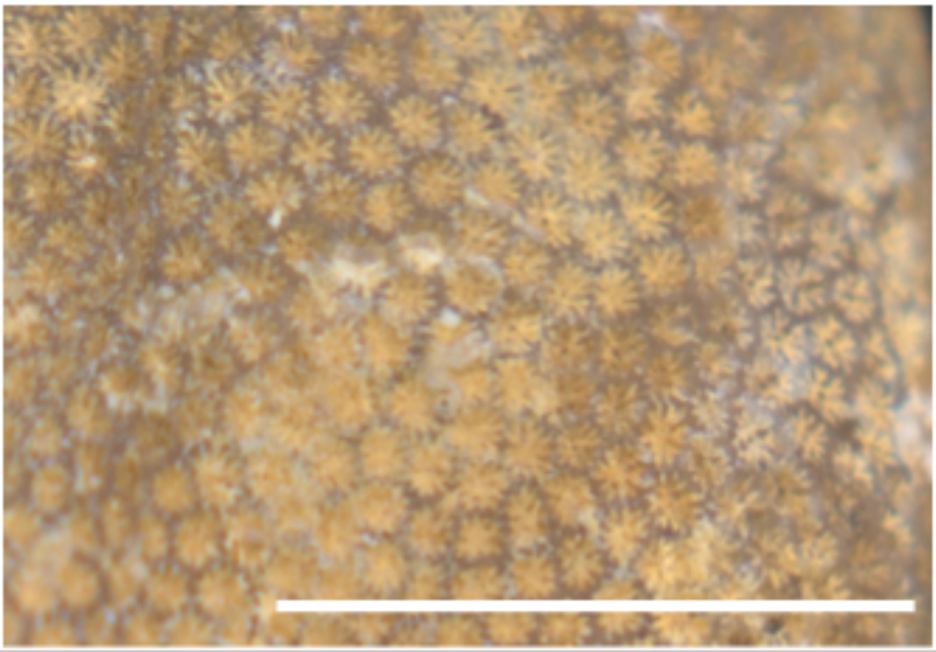
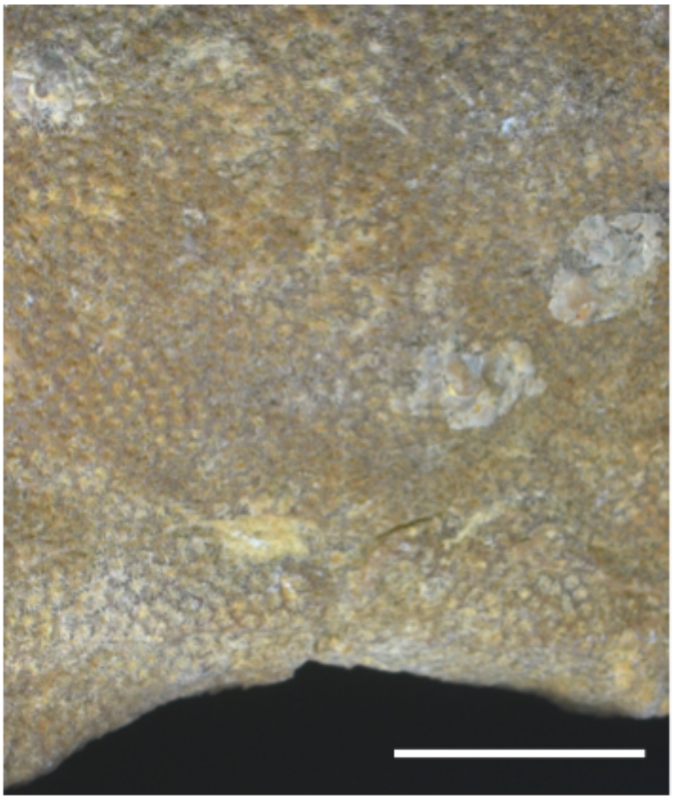


Figure 32: *Actinastrea minutissima* – surface view.



Alveopora catalai Wells, 1968

(Figs. 33 and 34.)

Identification Reference(s):

Veron and Pichon, 1982. pp. 110-113, figs. 216-223. Specimens pictured in this reference are recent specimens collected from eastern Australian waters in both deep and turbid environments.

Description: Branching/foliose, ramose colony form. Colony type: cerioid. Columella not visible. Septa/spines not preserved. Calice diameters: 1.7-4.9 mm. Calice: not exsert. Calice walls: porous/lumpy structure. Corallite spacing: 2.6-5.1 mm. Corallites: slightly rounded, generally hexagonal shaped. No dissepiments. Budding type: not seen (possibly extramural?). Branch diameter: 23.8-27.4 mm. Branch is very thick/wide when compared to other branching corals in this collection.

Remarks: This specimen has been identified as *Alveopora* as it has a lumpy appearance to the wall structure, which is presumed to be poor preservation of the porous wall structure in *Alveopora*. The lack of septa observed seems likely to be due to the small spine-like septa of *Alveopora* not being preserved. The porous structure of the corallum, and the ramose growth form are correct for attribution to this genus. This specimen appears to be the same as *Alveopora catalai* in Veron and Pichon, (1982), as the size of the branch and the size of the corallites of this specimen fit well with the species description given in the identification reference.

Specimens: Six specimens collected. Reference specimen: 1.8.359 (BMNH no. AZ7718).

Figure 33: *Alveopora catalai* - close up of corallites.

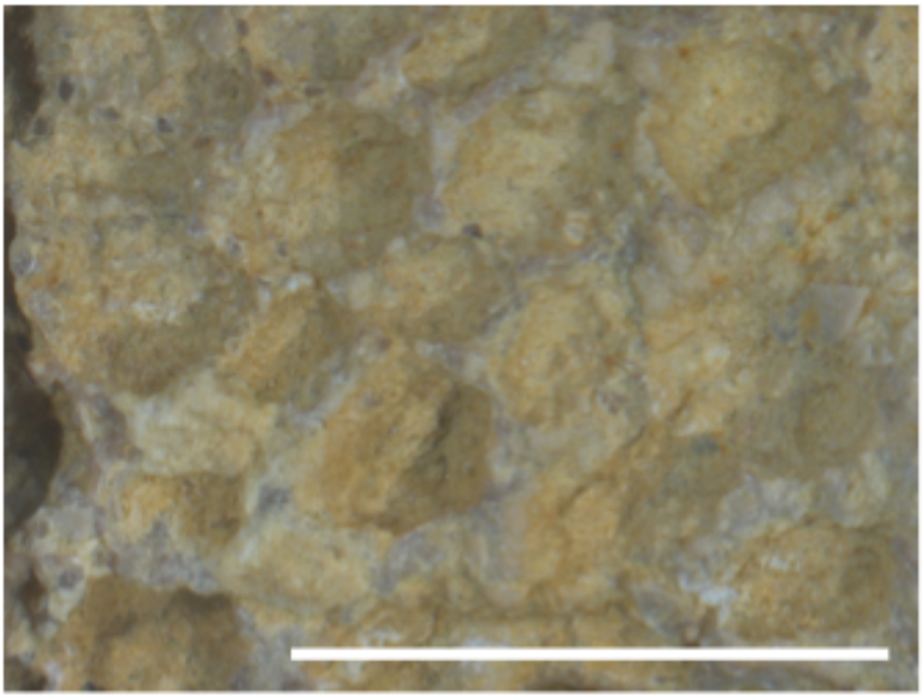
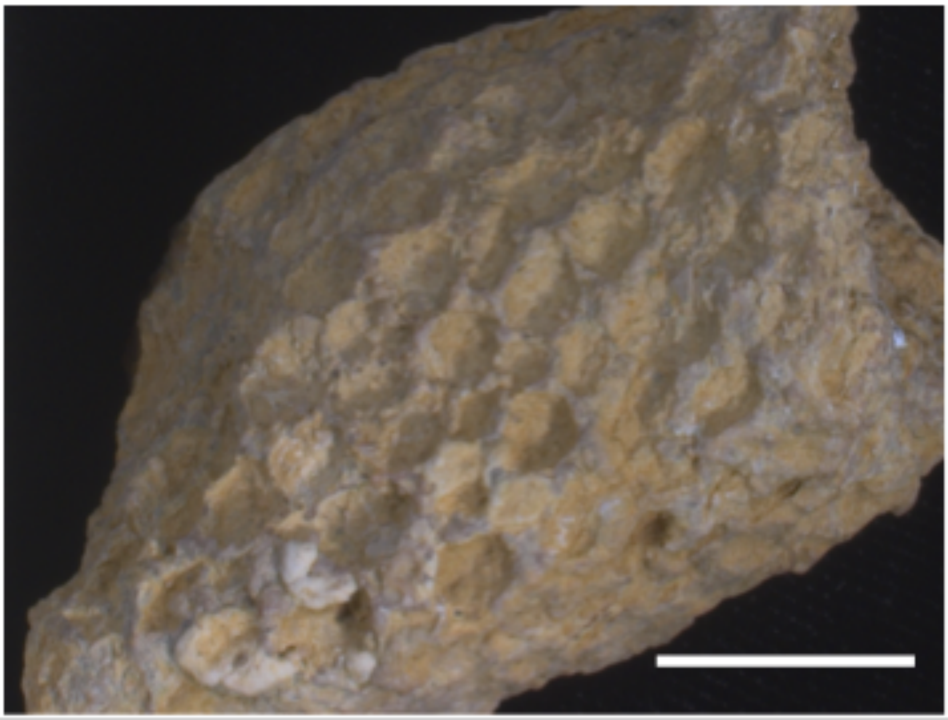


Figure 34: *Alveopora catalai* – corallum surface.



Anisocoenia variabilis Gerth 1923

(Figs. 35 and 36.)

Identification Reference(s):

Gerth, 1923. p. 94, pl. 5, figs. 5, 6; Leloux and Renema, 2007. p. 23, pl. 25, figs. 4-9. Specimens pictured in both references are syntypes (RM. 43068, RGM.167791 and RGM.167792).

Description: Massive colony form. Colony type: cerioid. Columella: not visible. Forty or more septa per corallite (feature poorly preserved). Septal numbers should be taken with caution, as preservation of this specimen is poor, more septa may have been present before diagenesis. Septal spacing: 3-4 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st order of septa reach columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/4 or less towards columella. Septa are not exsert. Distal septal margins: uneven, possible paliform lobes near valley centres. Septal faces: not preserved well enough. Calice diameters: 3.2-8.7 mm. Calices: slightly exsert. Corallite spacing: 2.7-7.7 mm. Some corallites are elongated, but these are rare. Corallites vary greatly in shape: round, angular, and elongated shapes are present. Corallites: possibly sub-plocoid (feature poorly preserved). ?Extramural budding. Underside of corallum: not visible.

Remarks: Because of the poor preservation, this specimen has been difficult to identify. It shows a similarity to *Goniastrea edwardsi* Chevalier, 1971 from the present day and fits the description in Veron *et al.*, (1977). It has same size range for calice diameters, shows extratentacular budding, and has 5-6 thickened septa in each corallite. This specimen most resembles fig. 153, (p.

83) in the latter reference. However this specimen group also strongly resembles *Anisocoenia variabilis* in Leloux and Renema (2007) and Gerth (1923). Therefore because the columella is not visible in the current specimens, and also that they are also closer in age and location to the *A. variabilis* specimens in the latter two references, I have identified this species *A. variabilis* rather than *G. edwardsi*. These two species as seen in the literature appear surprisingly similar to one another, and further research into synonymy of these 2 species may be required.

Specimens: Four specimens collected. Reference specimen: 1.6.171 (BMNH no. AZ7572).

Figure 35: *Anisocoenia variabilis* – close up of corallites.

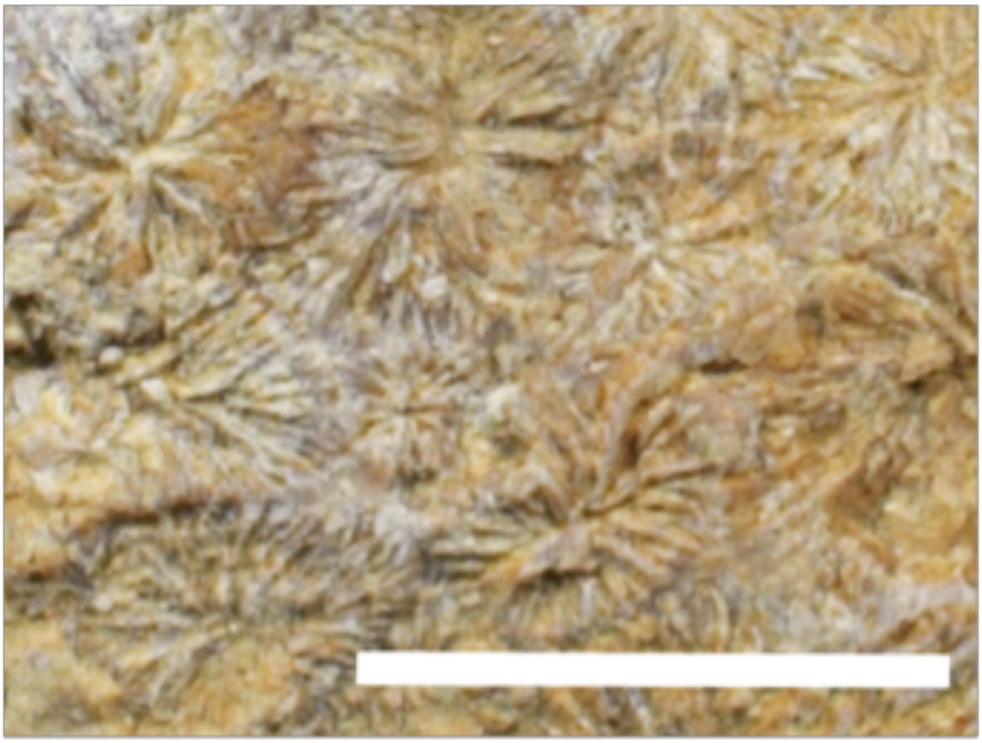
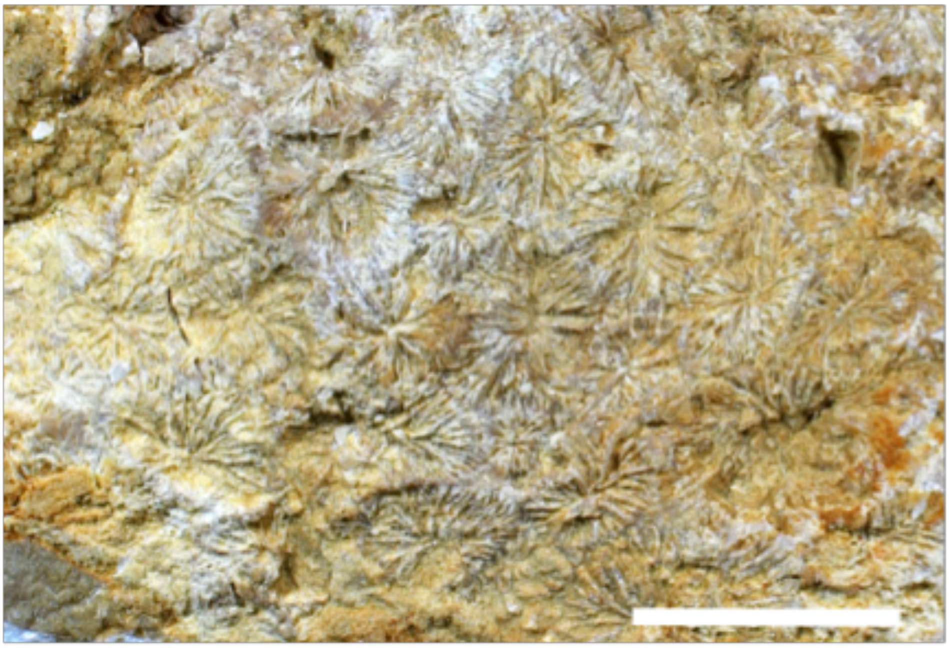


Figure 36: *Anisocoenia variabilis* – oral surface.



Antiguastrea* cf. *cellulosa Duncan, 1863

(Figs. 37 and 38.)

Identification Reference(s):

Vaughan, 1919. pp. 402-408, pl. 100, figs. 1-4a; Specimens are from Cathedral, St. John, Antigua and Friar's Hill, Antigua, all are fossil specimens from the Oligocene.

Description: Massive colony form. Colony type: cerioid. Columella: lamellar (feature poorly preserved). Approximately 30-50 septa per corallite. Septal spacing: 4 per mm. Septa: slightly exsert (at outer calice wall). Four orders of septa: large, tiny, small, tiny, medium, tiny, small, tiny, large etc. Septal lengths: 1st and 2nd orders of septa reach calice centre (or columella), 3rd order reaches about 1/2way, 4th order reaches less than 1/4 way. largest septa: slightly more exsert than other septa. Distal septal margins: uneven, may possibly have had numerous toothy projections, that have subsequently broken-off. Septal faces: not preserved well, as there is sediment infilling the calice. Short septo-costae present at outer edges of calice. Calice diameters: 2.1-5.0 mm. Calices are exsert. Corallite spacing: 2.5-6.0 mm. Corallite walls: slightly separated from adjacent corallites. Corallites: rounded, but irregular in shape. Extramural budding. Possible vesicular dissepiments (feature poorly preserved).

Remarks: This specimen has been identified as the belonging to the genus *Antiguastrea* because it has a lamellar columella, exhibits extratentacular budding, the size and structure of the corallites are correct for the genus, as well as the septo-costae around the calice. It fits the description of the species *Antiguastrea cellulosa* given in Vaughan (1919), but has slightly thicker features, which may be real or may be diagenetic alteration. Comparison to type specimens would aid in a confident identification, as assessment of the level of diagenesis (specifically the thickening of the corallum) would be necessary.

Specimens: Two specimens collected. Reference specimen: 1.5.136 (BMNH no. AZ7550).

Figure 37: *Antiguastrea* cf. *cellulosa* – internal corallite detail.

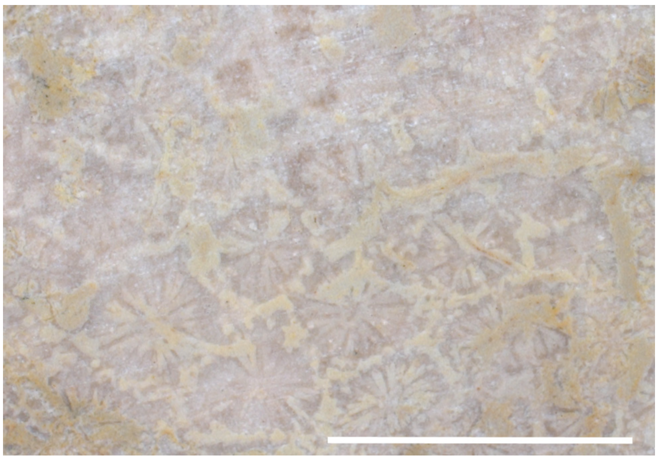


Figure 38: *Antiguastrea* cf. *cellulosa* – upper surface, corallites.

Astreopora* cf. *expansa Gerth, 1923 **/cf. *rutteni*** Brüggeman, 1887

(Figs. 39 and 40.)

Identification Reference(s):

Astreopora expansa: Leloux and Renema, 2007. p. 24, pl. 27, figs. 7-11; *Astreopora rutteni:* Veron, 2000. Vol. 1. pp. 434-435. The specimens from Leloux and Renema (2007) are syntypes from the Upper Miocene of Indonesia (RGM.42983 and RGM.42984). The specimens from Veron (2000) are recent, specimens from shallow reef environments around the Indo-West Pacific region.

Description: Platy colony form. Colony type: plocoid. No columella or columella not visible. Approximately 12 septa per corallite. Septa: not exsert. Septal spacing: 2-3 per mm (measured around outer edge of calice). One, possibly 2 septal orders (feature poorly preserved). Septal pattern: large, small, large, small etc. (smaller septa may not be present: could be preservation). Septal lengths: 1st order reaches centre, 2nd order reaches halfway towards centre. Septa widen towards the centre in transverse section, so that they appear to have a teardrop shape at the axial end. Distal septal margins: smooth. Septal faces: smooth (feature poorly preserved). Calice diameters: approximately 3.0 mm. Corallite spacing: 4.3-9.8 mm. Calices slightly raised above coenosteum on one side. Coenosteum structure: porous (covered in small, knob-shaped projections). Budding type: not seen (probably extramural). Extracalicular, tabular dissepiments present. Underside of corallum: slightly lumpy and porous. Plate thickness: 9.0-18.7 mm. Corallum appears to have undergone thickening of structures during diagenesis.

Remarks: This specimen has been identified as *Astreopora* as it has tabular dissepiments, no axial corallites, small corallites without an obvious columella and a porous, spiny coenosteum. It is difficult to tell whether this specimen is most closely allied to the species *A. expansa* (in Leloux and Renema, 2007) or *A. rutteni* (figured in Veron, 2000), because of the preservation. It is possible that this specimen is the ancestor of both of these species, or that these two species should be synonymised. Comparison to the type specimens of both species to assess the effect of diagenesis is needed.

Specimens: Three specimens collected. Reference specimen: SaQ: 83 (BMNH no. AZ8689).

Figure 39: *Astreopora* cf. *expansa/rutteni* - corallites.

Figure 40: *Astreopora* cf. *expansa/rutteni* – side view, dissepiments.

Barabattoia aff. *amicorum* (Milne Edwards and Haime, 1850)

(Figs. 41 and 42.)

Identification Reference(s):

Veron, 2000. Vol. 3, p. 133; also *Favia amicorum* complex: Veron *et al.*, 1977. pp. 30-33, figs. 37-44. The specimens pictured in Veron (2000) are recent specimens from shallow reef environments of SE Asia and the Great Barrier Reef, Australia. The specimens in Veron *et al.* (1977) are recent specimens mainly from turbid water environments in eastern Australia. Fig. 37 is the Holotype of *F. amicorum*, while figs. 42 and 43 are the Holotypes of *B. mirabilis* and *Bikiniastrea laddi* (thought to possibly be synonymous species).

Description: Massive colony form. Colony type: plocoid. Columella: spongy. Numerous septa per corallite (>50). Septal spacing: 1-2 per mm. Two septal orders visible: large, small, large, small etc. Septal lengths: 1st septal order reaches columella, 2nd order septa are much reduced. Septa: slightly exsert at outer wall of calice, and are continuous outside calice as septo-costae; spacing: 1-2 per mm. Distal septal margins: slightly uneven/toothy. Septal faces not preserved well enough (sediment infilling calices). Calice diameters: 5.9-11.6 mm. Calice wall is thick and rounded. Corallites: exsert (sub-phaceloid), up to 10 mm above coenosteum. Corallites: rounded or oval in shape. Corallite spacing: 11.8-18.5 mm. Budding type: not seen. Extracalicular, vesicular dissepiments present. Underside of corallum: has ridges that spread out from centre of corallum and widen towards edges, and it is covered in costae; ridges: approximately 16.0 mm at edge of corallum, costae: 0-1 per mm.

Remarks: This specimen has been attributed to the genus *Barabattoia* as it has large, thick-walled, exsert, plocoid corallites (those seen in the closely related *Favia* and *Montastraea* are generally much thinner walled or less exsert). This specimen fits the description of the *Favia amicorum* complex in Veron *et al.* (1977), renamed *Barabattoia amicorum* by Veron (2000). The number of septa per corallite is far larger in the present specimen than in *B. amicorum* (in Veron, 2000*)*, so "aff." status has been given as this specimen is thought to be a different but unknown species of *Barabattoia*.

Specimens: One specimen collected, the reference specimen: 1.4.111 (BMNH no. AZ7519).

Figure 41: *Barabattoia* cf. *amicorum* - internal corallite detail.

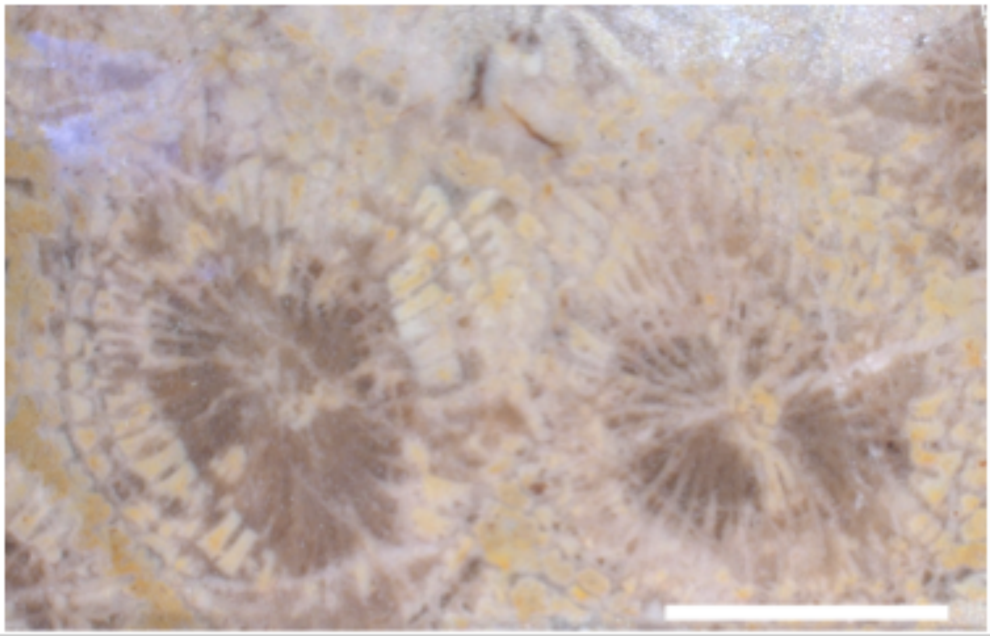
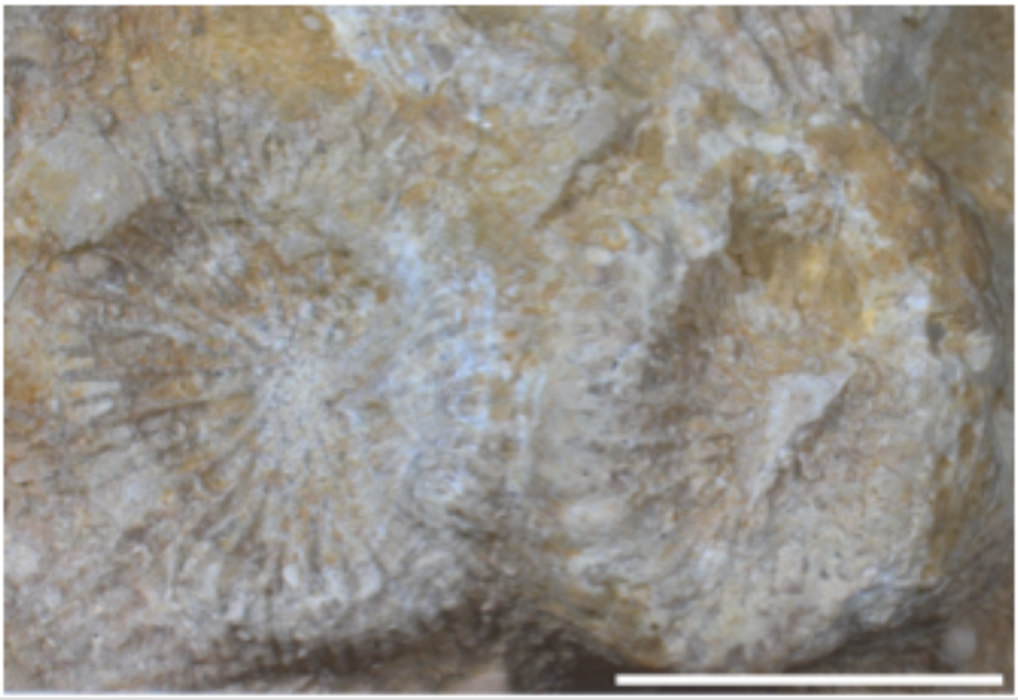


Figure 42: *Barabattoia* cf. *amicorum* – close up of surface corallites.



Cantharellus cf. *noumae* Hoeksema and Best, 1984

(Figs. 43 and 44.)

Identification Reference(s):

Hoeksema, 1989. pp. 212-215, figs. 558-565. The specimens pictured in this reference are recent and include the Holotype (RMNH 16241) and paratypes (RMNH 16264 and RMNH 16265), collected from Nouméa, New Caledonia.

Description: Solitary, patellate/infundibuliform colony form. Columella: not visible. Numerous (>50) septa per corallite. Septal spacing: 2-3 per mm. Septa: not exsert, although some get taller nearer calice centre. Three or more orders of septa (feature poorly preserved): large, small, medium, small, large etc. Septal lengths: 1st septal order reach the calice centre, 2nd order reach 2/3 to centre, 3rd order reach approx. 1/2 way to centre (possible 4th order that reach about 1/3 towards centre, but not preserved well). Distal septal margins: uneven with granulations along them. Septal faces: covered with tiny granulations. Calice diameter: 48.4 mm (across widest part). Calice edge is lobed (where lobes meet, calice edge is folded parallel to direction of septo-costae). Extramural budding. No dissepiments present. Surface thickness (the explanate part of the corallite): 1.0-4.2 mm. Underside of corallum: feint septo-costae (spaced at 2-3 per mm). Stalk diameter cannot be measured due to encrusting organisms and debris.

Remarks: This specimen has been identified as belonging to the genus *Cantharellus* as it is solitary and infundibuliform in shape, it is attached, has numerous septa showing granulations over the surfaces and the corallum outline (in transverse view) is oval in shape. It has no secondary centres (called stomata in Hoeksema, 1989), and is therefore not a member of the related genus *Lithophyllon*. This specimen most resembles the species *Cantharellus noumae* in Hoeksema (1989). The scale and overall structure of the corallum is the same. However, this specimen does not appear to have diverging septa near the edges of the calice, and the septa are possibly slightly thinner in this specimen than in the figured specimen of Hoeksema (1989). C. noumae has been synonymised with *Trochoseris florescens* Felix, 1921, however the pictured specimen in Gerth (1923) and Leloux and Renema (2007) looks somewhat different to this specimen, and the calice diameter is much larger, so I am unsure of Hoeksema's synonymy of the 2 species. Further comparison to type material is needed to confirm or refute this last observation.

Specimens: Two specimens collected. Reference specimen: SaQ2: 142 (BMNH no. AZ8702).

Figure 43: *Cantharellus* cf. *noumae* – view of oral surface.

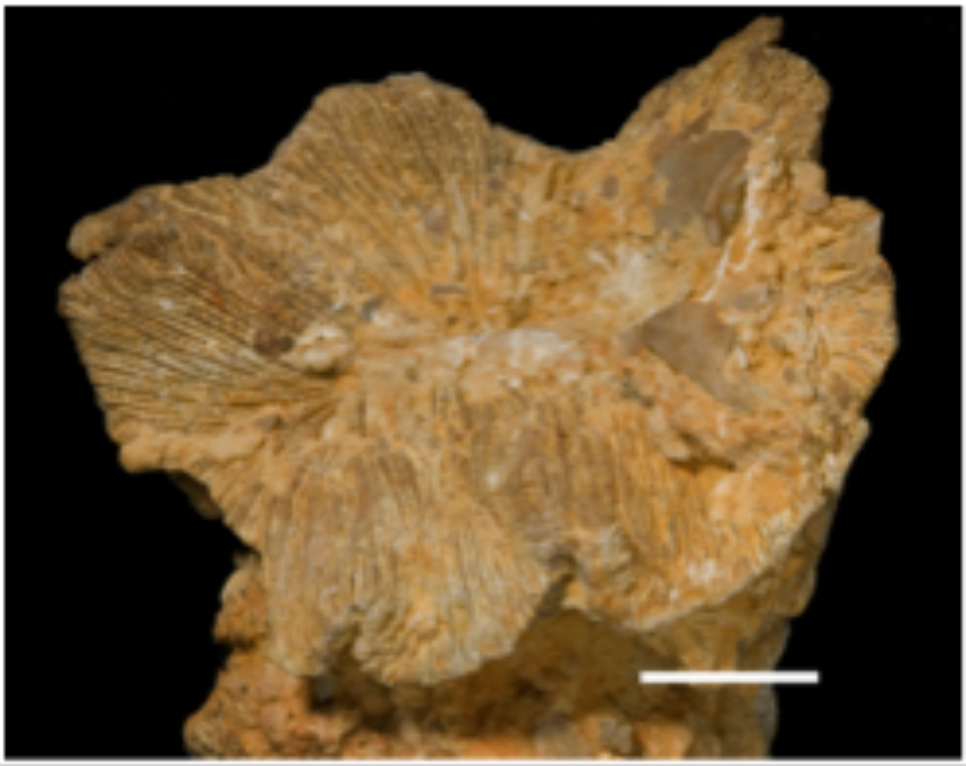
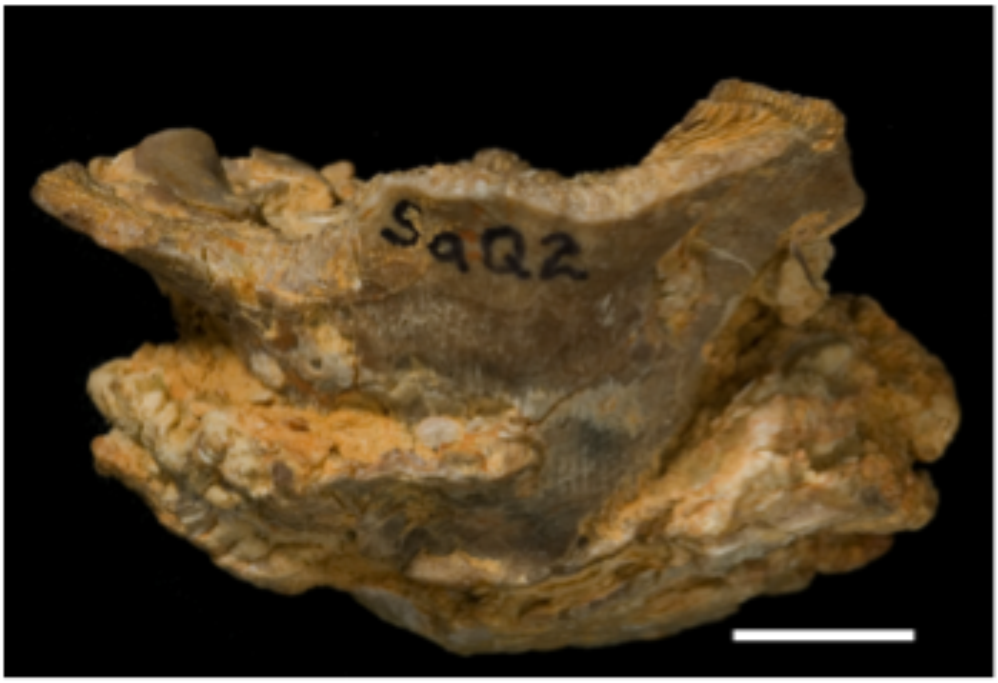


Figure 44: *Cantharellus* cf. *noumae* – side view of corallum.



Caulastraea* aff. *farsis Schuster, 2002

(Figs. 45 and 46.)

Identification Reference(s):

Schuster, 2002. p. 21, pl. 6 (p. 46-47), figs. 1-4. Specimens figured in this reference are from the Late Oligocene of the Qom formation, Iran. Figure 1 (pl. 6) is the Holotype.

Description: Massive/branching colony form. Colony type: phaceloid. Columella: fascicular/spongy (feature poorly preserved). Approximately 45-65 septa per corallite. Septa are highly exsert. Septa have bulbous ends at columella. Septal spacing: 1-3 per mm. At least 4 orders of septa: large, tiny, small, tiny, medium, small, large etc. Septal lengths: 1st and 2nd orders of septa reach calice centre, 3rd order reach 1/3 - 1/2 way to centre, 4th order extend approximately 1.5 mm towards centre. Large septa have large lobes at the calice edge, which extend over edge by approximately 3 mm. Distal septal margins: uneven (possibly with numerous toothy projections, but these have broken-off). Septal faces: smooth (feature poorly preserved). Calice diameters: 8.9-15.1 mm. Calices are exsert (is a phaceloid coral). Corallite spacing: approximately 8.9-17.2 mm. ?Intramural budding. Branch diameter = corallite diameter. Synapticulae present inside calice: linking septa together for <2.5 mm from outer edge towards columella, usually 2-3 are present between an adjacent pair of septa. Epitheca is present on corallite exterior. There are 3 layers of epitheca.

Remarks: This specimen belongs to the genus *Caulastraea* as it has a phaceloid colony type produced by mono-tristomodaeal budding, and has a spongy columella, it also has the epithecal layers around the outside of the corallites seen in *C. farsis* in Schuster (2002). I believe this to be an extinct *Caulastraea* species, very similar to *Caulastraea farsis* (in Schuster, 2002). This specimen fits well with Schuster's (2002) description of *C. farsis*. However this specimen was not observed to have anastamosing septa as in *C. farsis*, hence the "aff." status. Further investigation may prove that this specimen is the same as *C. farsis*, but presently that cannot be stated for certain.

Specimens: Eighteen specimens collected. Reference specimens: 5.-.1343 - 5.-.1356 (excluding 5.-.1346) (BMNH nos. AZ8352-8365; excluding AZ8355).

Figure 45: *Caulastrea* aff. *farsis* – internal corallite detail.

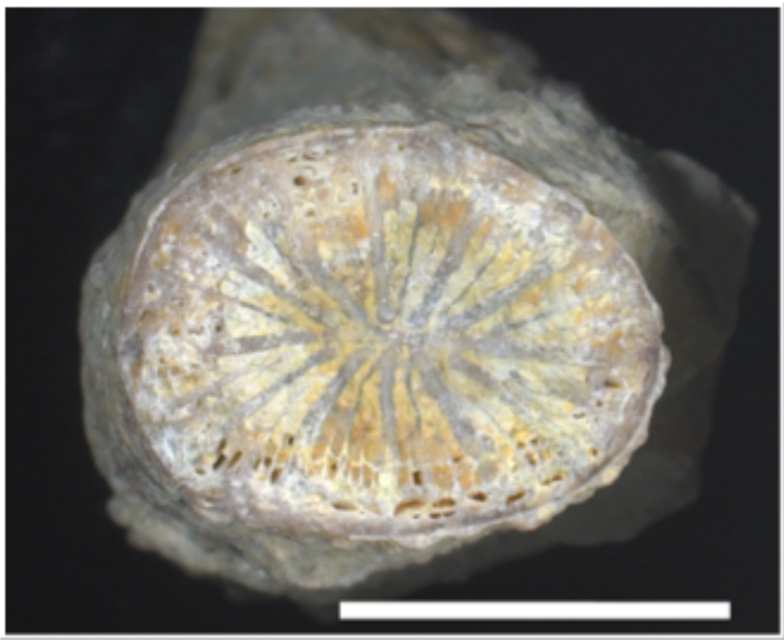
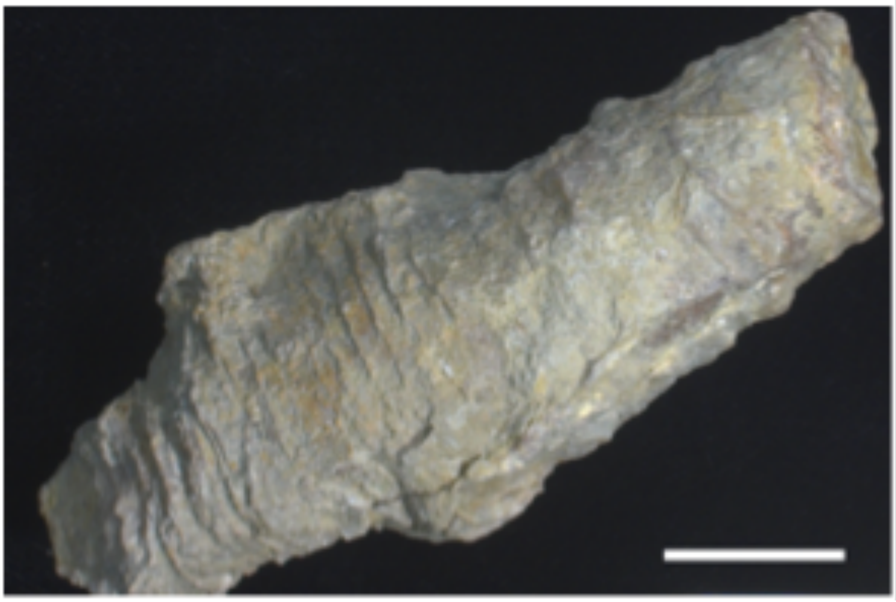


Figure 46: *Caulastrea* aff. *farsis* – outer surface, showing epitheca.



?Caulastraea sp. 1 Dana, 1846

(Figs. 47 and 48.)

Identification Reference(s):

Genus *Caulastraea*: Wells, 1956. p. F401. The specimen pictured in this reference is a Recent specimen from Fiji. Veron, 2000 Vol. 3 pp. 91-97. Specimens pictured (in Veron, 2000) are recent, living species from Eastern Africa and the Indo-West Pacific.

Description: Branching colony form. Colony type: phaceloid. Columella: spongy (feature poorly preserved). Numerous (>50) septa per corallite. Septal spacing: 3-4 per mm. Septa: exsert at outer edge of calice. Two orders of septa visible: large, small, large, small etc. Septal lengths: 1st order septa reach calice centre, 2nd order reach ½ way towards centre. Septo-costae distal margins: Irregular dentations. Septal faces: smooth or with small projections (feature poorly preserved). Calice diameters: 2.1-15.7 mm; the large variation in this measurement is due to irregular shaped calices. Calices: exsert. Corallite spacing: approximately 12.9 mm. Corallites located mainly on one side of branch, direction of corallites outward growth alternates along the branch. Budding type: not seen. Coenosteum: smooth with feint septo-costae (approximately 2 per mm). Underside of corallum: not visible. Branch diameter: approximately 10.0 mm.

Remarks: There appears to be more than one morphology in this group: one type has fairly oval-shaped corallites (e.g. specimen ?:337 a), and the other has wavy, irregular-walled corallites (e.g. the reference specimen for this group). However, given that I cannot find a specimen that appears similar this specimen group in the literature, I have chosen to leave the two morphologies within the same group, as I do not know what the inter-species difference in morphology may be. This group has been attributed to the genus *Caulastrea* because the specimens have phaceloid corallites, there are septo-costae present on outside of corallites, the septal pattern is similar to other members of this genus, the columella is spongy, and the septal dentations are irregular. It is similar to *Caulastraea connata* (Ortmann, 1892) in the irregular shape of the corallites, and the septal pattern (seen in Veron, 2000, Vol. 3), however *C. connata* does not branch in the same way that these specimens do, and it also has much more prominent septo-costae extending down the outer edge of the corallites; the calices are not as deep in the present specimens. I have therefore not attempted to attribute this group to a species.

Specimens: Six specimens collected. Reference specimen: SaQ3: 2040 b (BMNH no. AZ8714).

Figure 47: ?*Caulastrea* sp. *1* - close up of corallite.

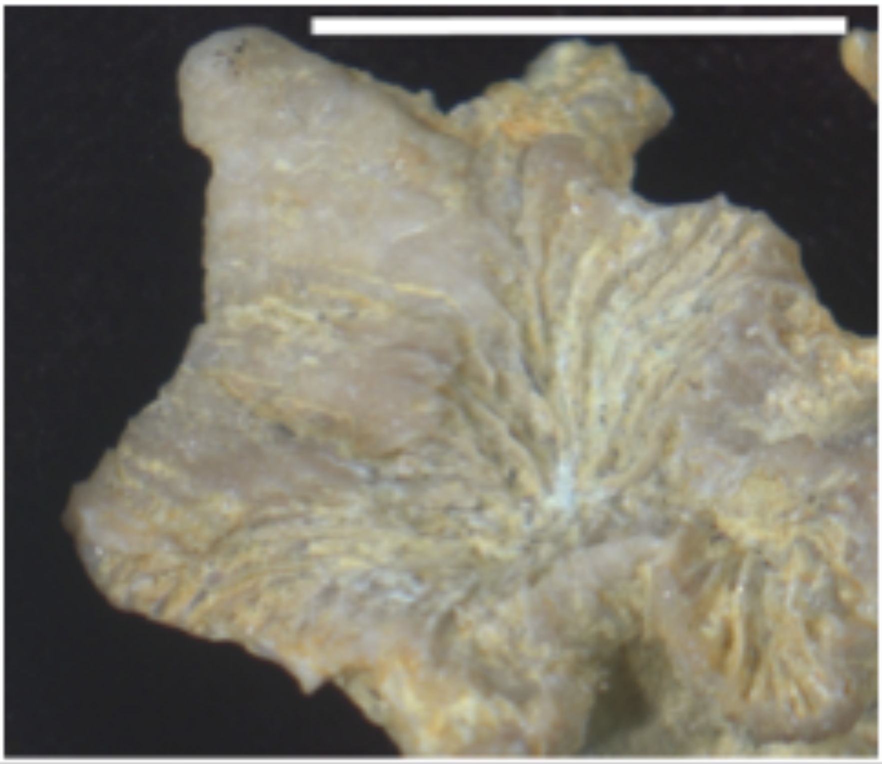
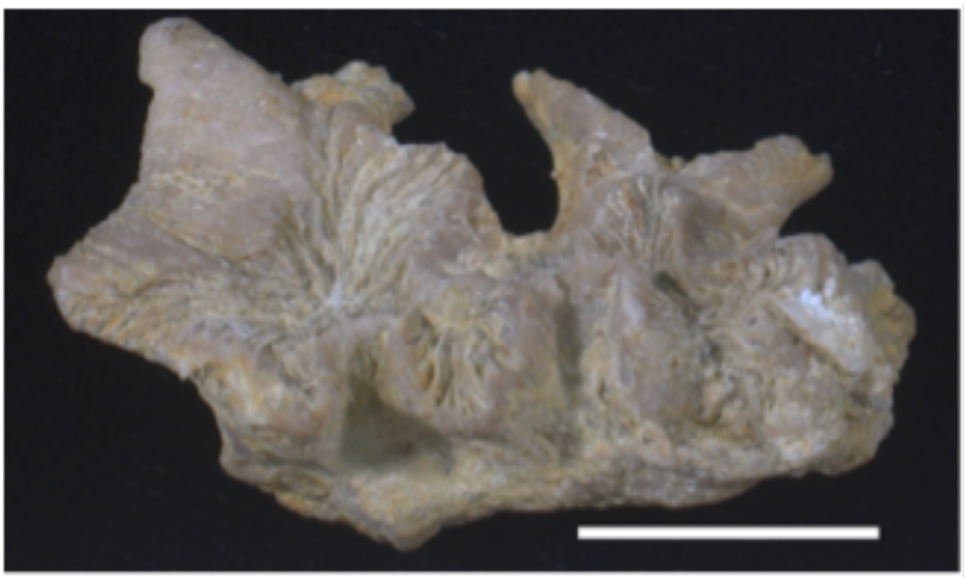


Figure 48: ?*Caulastrea* sp. *1* – whole specimen.



aff. *Cladocora arbuscula* Lesueur, 1821

(Figs. 49 and 50.)

Identification Reference(s):

Veron, 2000. Vol. 3, p. 90. Specimens figured are live specimens, from waters around Florida, USA (the earliest fossil record for this genus is stated as from the Eocene of the Caribbean and Tethys); also *Placophyllia bandeli* Baron-Szabo, 1998 *in* Baron-Szabo, 1998. p. 137, pl. 10, figs. 1, 4, 6; specimens figured in this reference are from the Campanian (Cretaceous) of northern Spain, MB (Humboldt Museum, Berlin) nos. K. 1131 (holotype), K.1132, K.1133.

Description: Branching colony form. Colony type: phaceloid. Columella: not visible. Approximately 48 septa per corallite. Septal spacing: 3-4 per mm. Septa: slightly exsert. Septa are very evenly spaced around calice. Four orders of septa: large, small, medium, small, large etc.; occasional tiny septa observed on either side of small septa, but last order is incomplete. Septal lengths: 1st order of septa reach calice centre, 2nd order reach 1/2 way towards centre, 3rd order reach about 1 mm towards the centre, and the 4th order reaches about 0.5 mm towards the centre. Distal septal margins: uneven, possibly with toothy projections (feature poorly preserved). Septal faces: not preserved well enough to comment on, as there is sediment-infilling calice. Calice diameters: 5.8-6.5 mm. Corallite spacing: not seen (specimen is broken). Budding type: not seen. Colony has straight branches, with septo-costae extending over exterior; 2-3 septo-costae per mm. Ridges of septo-costae coincide with septal placement on inside of corallum. Branch diameter: 6.8-7.4 mm.

Remarks: This specimen appears similar to the genus *Cladocora*, but has 3 orders of septa rather than 2. It also does not have any ornamentation on the septo-costae, and has wider corallites than either species in Veron (2000). Superficially it appears most similar to the species *Cladocora arbuscula* in Veron (2000). The specimen fits very well into the description of *Placophyllia bandeli* in Baron-Szabo (1998), inclusive of number of septal orders, number of septa, and the structure of the septa in transverse view. The calice diameter of this specimen is a few mm smaller though. It is unusual to assign Cretaceous names (i.e. *Placophyllia bandeli*) to Cenozoic corals due to the ~60 million year time gap, but it may be warranted in this case, however I have chosen to assign this specimen “aff. *Cladocora*” until further study and comparison proves otherwise. The columella, presence of paliform lobes and budding types are not visible in this specimen, and these would normally be used to distinguish between these two genera (*Cladocora* and *Placophyllia*), therefore generic identification is uncertain in this case.

Specimens: Fifteen specimens collected. Reference specimen: 1.4.97 (BMNH no. AZ7536).

Figure 49: aff. *Cladocora arbuscula* – side view of corallum.

Figure 50: aff. *Cladocora arbuscula* - internal corallite detail.

(Para)Clavarina aff. *triangularis* Veron and Pichon, 1980

(Figs. 51 and 52.)

Identification Reference(s):

Veron and Pichon, 1980. pp. 223-228, figs. 375-384. The specimens pictured in this reference are recent specimens collected from various locations around eastern Australia. The holotype is pictured in fig. 375, and paratypes are pictured in figs. 377 & 378.

Description: ?Foliaceous/branching colony form. Colony type: ?meandroid. Columella: not visible. Numerous septa per corallite (>30). Septal spacing: 1-2 per mm. Septa: fairly regularly spaced. Septa: exsert. Two septal orders visible: large, small, large, small etc. Septal lengths: 1st order septa reach valley centres, 2nd order reaches within 3mm of valley centres. Septal placement around valley centres appears like barbs attached around the rachis of a feather. Distal septal margins: uneven (possibly with toothy projections). Septal faces: slightly lumpy (are difficult to observe due to sediment infilling between septa and poor structural preservation). Budding type: not seen. Valley widths: 5.7-12.8 mm. Valley depths ≤2.4 mm. Edges of valleys often curl-over towards centres. Occasional lobes are present, formed where calice wall does not curl-over. Underside has feint costae that radiate slightly but generally follow direction of valley centres; costae spacing: 2-3 per mm. Plate thickness: 1.2-4.7 mm.

Remarks: This specimen group has been attributed to the genus *Clavarina* as they have irregular dentations on the septal margins, the specimens are presumed to be the ends of ramose branches (similar to those pictured in Veron and Pichon, 1980, p. 226, fig. 381), the valley walls curl-over towards the centre of the valleys. The specimens are also foliaceous which is the character that distinguishes *Clavarina* from *Merulina*. These specimens are similar to *Clavarina triangularis* in Veron and Pichon (1980), except that they have unifacial branches.

C. triangularis is also called *Paraclavarina triangularis*, but I cannot find reference where name was changed. It is stated as "*Paraclavarina triangularis*, Veron, Pichon and Best, 1977" in Cairns *et al.*, (1999, p.34), but 1977 is earlier than the original description of *Clavarina triangularis* Veron and Pichon, 1980, and in the 1980 work there is no reference to this alleged 1977 identification. Cairns *et al.*, (1999) appear have poorly referenced their nomenclature, and they have referenced the 1977 edition of *The Scleractinia of Eastern Australia* series, which is on the Faviidae and the Trachyphyllidae, instead of the 1980 edition on the Agariciidae etc. Also somewhere between 1980 and 1999 someone has changed *Clavarina triangularis* to *Paraclavarina triangularis* and I cannot find the relevant reference, although Veron (2000; vol.2. p.374-375) attributes the name *Paraclavarina triangularis* to Veron and Pichon, 1980, even though in this reference the generic name was *Clavarina*.

Specimens: Three specimens found. Reference specimen: PP1: 401 c (ii) (BMNH no. AZ8621).

Figure 51: *(Para)Clavarina* aff. *triangularis* – close up of oral surface.

Figure 52: *(Para)Clavarina* aff. *triangularis* – reference specimens.

Colpophyllia aff. *natans* Hottuyun, 1772

(Figs. 53 and 54.)

Identification reference(s):

Veron, 2000. Vol. 3. pp. 210-211. The specimens pictured in this reference are modern, living species from the Caribbean (although the earliest fossil records are from the Eocene of the Caribbean and Tethys).

Description: Massive colony form. Colony type: cerio-meandroid. Columella: ?Spongy (detail in-filled by sediment). Septal spacing: 2-3 per mm. Septa: not exsert. Septa alternate across walls in some places but not others. Two or possibly 3 orders of septa: large, (small), medium, (small), medium, (small), large etc. Septal lengths: 1st order reaches centre of valleys, 2nd order reach

2/3 towards centre, 3rd order reaches approximately 1/3 towards centre (latter observation is uncertain). Distal septal margins: uneven (possible numerous toothy projections that were broken-off). Septal faces: bumps/projections present (not easy to observe due to poor preservation). Valley widths: 7.0-8.0 mm. Valley depth: approximately 5.0-6.0 mm. Continuous valleys (may not be correct for entire species as specimen measured is small). Walls occasionally anastomosing. Budding type: not seen. Underside of coral: smooth with some feint costae (2-3 per mm). Identification from 1 small piece only.

Remarks: The features are most important in identifying this specimen as *Colpophyllia,* are that the specimen is meandroid and *Hydnophora*-like, the septa do not have internal lobes, are quite even in size and spacing, and the valleys are discontinuous. This specimen appears to be a small piece of what was probably a larger coral, although some of the outer edge appears to have been preserved. This could be the central portion of a coral, but it is hard to tell due to the poor preservation of detail on this specimen. This coral appears most similar to *Colpophyllia natans* (seen in Veron, 2000), but is half the scale, i.e. valleys are approximately 7mm centre to centre rather than almost 15mm in *C. natans*. I am slightly unsure of this attribution because *Colpophyllia* in the present day is only found in the Caribbean, not the IWP. However it was present in the Eocene of the Tethys (Veron, 2000), so it is possible that it could have migrated the IWP by the Late Oligocene. Also the identification is based only on one small, poorly preserved piece. Therefore I have given it “aff.” species status.

Specimens: Only 1 specimen collected, the reference specimen: SaQ1: 137 (BMNH no. AZ8657).

Figure 53: *Colpophyllia* aff. *natans* – corallite.

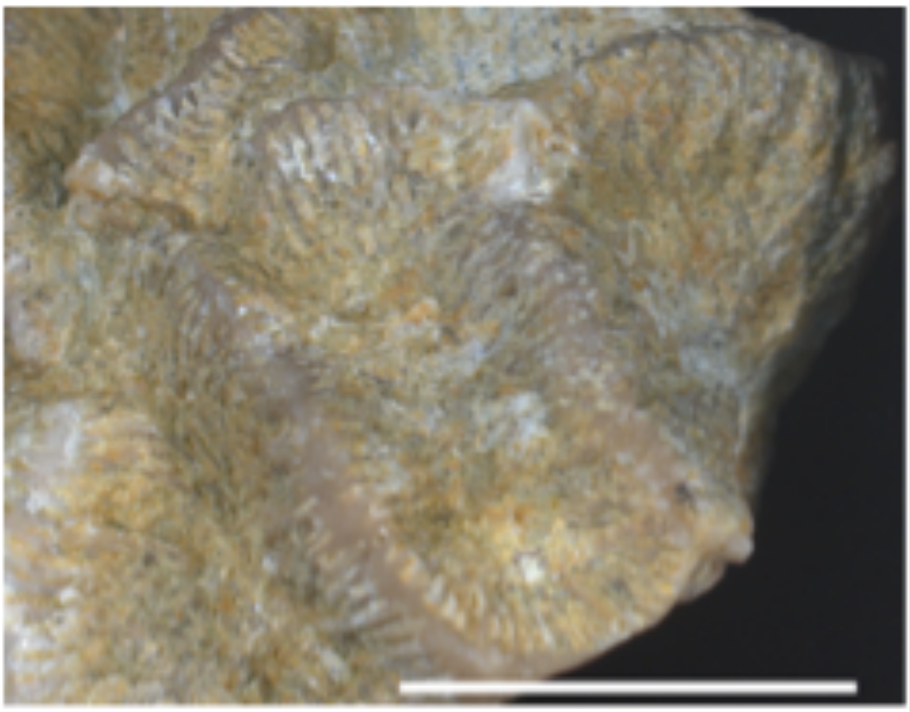
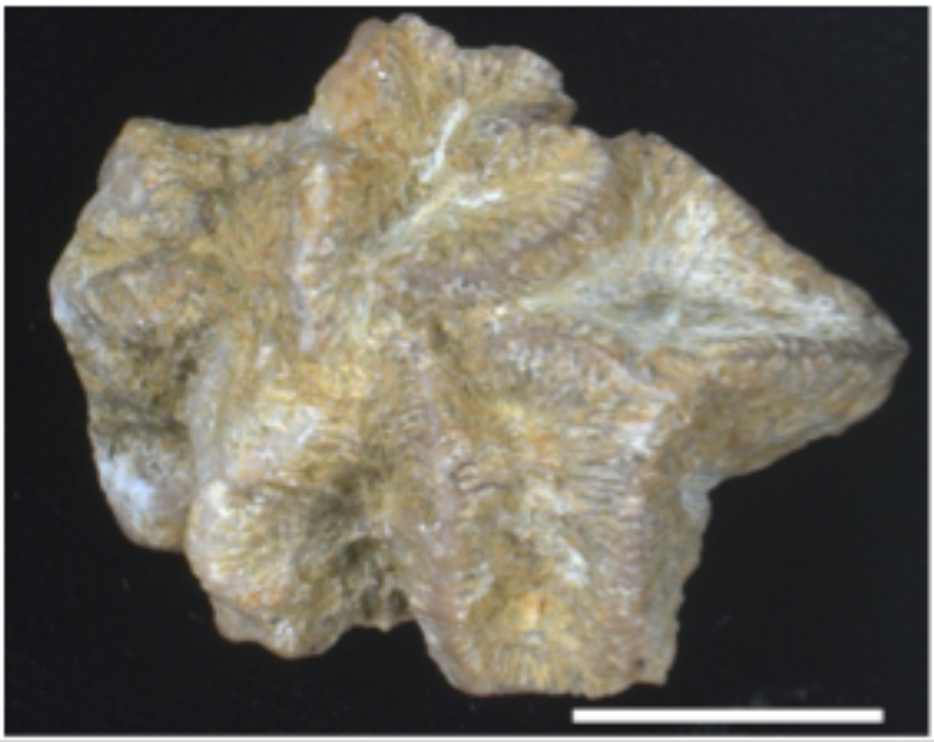


Figure 54: *Colpophyllia* aff. *natans* – whole specimen, upper surface.



In the following section I have separated three morphs of what has been identified as *Cynarina lacrymalis* (Milne Edwards and Haime, 1848) by various authors (Veron and Pichon, 1980; Ditley, 1980; Milne Edwards and Haime, 1848) into 3 specimen groups. *Cynarina* sp. 1 and *Cynarina* sp. 2 co-occur, as do *C.* sp. 2 and *C.* sp. 3, they appear quite structurally different to one another (although other authors believe that they are the same species; see the species descriptions below for author references). Further study of these *Cynarina* specimens is required, as the morphology is different in all 3 specimens, and there are no thorough studies into the species plasticity of *Cynarina lacrymalis* in the literature, so it is not possible to definitively say whether they are all the same species. The genus *Cynarina* is also very closely related to the genus *Indophyllia* (in Best and Hoeksema, 1987), and further study should place the specimens here into one or other of these two genera. The reason I have placed these three specimen groups in the genus *Cynarina* is because they are solitary, turbinate or attached, they have large lobulate dentations on the septal margins, they have the same septal orders as other members of the genus, and they have a spongy columella. It is possible that *Cynarina* sp. 3 should be attributed to the genus *Indophyllia,* as only for this genus have I seen presence of an epitheca mentioned as one of the characters (Best and Hoeksema, 1987); however the museum specimen of *Cynarina* and also the specimens figured in Veron and Pichon, 1980 appear to also have epitheca present, so it is possible that there is still some taxonomic confusion between these two genera.

Cynarina sp. 1 *(?cf. lacrymalis)* (Milne Edwards and Haime, 1848)

(Figs. 55 and 56.)

Identification Reference(s):

Ditley, 1980. p. 76 and p. 249, fig. 332; specimen figured is from Thailand (Ko Phi Phi Do W., Laem Soy, Pangah Bay, 15m depth). Veron, 2000. Vol. 3. pp. 82-83; the specimens figured in this reference are modern, living specimens from around the Indian Ocean and the Indo-West Pacific, collected from protected reef environments and deep sandy substrates.

Description: Solitary, tympanoid, attached colony form. Columella: spongy. Approximately 48 septa. Septal spacing: 1 per mm. Septa: highly exsert. Three septal orders (possibly 4), with the pattern: large (16 total), small (32 total), medium (16 total), small, large etc.; the smallest septa, where present, are often obscured by sediment. Septal lengths: 1st order of septa reach columella, 2nd order reaches 2/3 to columella, 3rd order reaches approximately 1/4 towards the columella. Distal septal margins: large lobe at calice edge, large toothy projections along rest of margins towards calice centre. Budding type: not seen. Septal faces: small, evenly spaced bumps/granules, possibly extending parallel to septal margins? Calice diameter: 26.4 mm at widest point. Calice appears oval in shape, when viewed in transverse section. Cannot observe corallum underside due to heavy encrustation. Septo-costae: extend down outer wall of corallite; 1 per mm. Height of corallum: 4.3-10.7 mm.

Remarks: This specimen group is most similar to the present day species of *Cynarina lacrymalis*. It looks like *C. lacrymalis* figured in Ditley (1980), but it is not the same as the museum specimen BMNH 23283. This specimen (LQ: 2029 a) and the Ditley (1980) specimen differ from the museum specimen in having large, highly exsert septal lobes at the outer edge of the calice, which stick-out over the corallite wall, although it is possible that these may have broken-off in the BMNH 23283. Neither the present specimen nor the Ditley (1980) specimen have an epitheca, which is faintly present on the museum specimen. This specimen has a tympanoid growth form and the calice appears oval and slightly irregular. These features are not present in BMNH 23283. The specimen here and the museum specimen share the same septal layout and overall growth form. I therefore place them in the same genus (C*ynarina*), but not the same species. The main features used for this identification are: the tympanoid growth form with large attachment site, the large septal lobes at the calice edge, first order of septa are much thicker than the others, and no visible epitheca.

Specimens: One specimen found, the reference specimen: LQ: 2029 a (BMNH no. AZ8468).

Figure 55: *Cynarina* sp. 1 – side view.

Figure 56: *Cynarina* sp. 1 – oral surface.

***Cynarina* sp. 2 (?cf. *lacrymalis*)** (Milne Edwards and Haime, 1848)

(Figs. 57 and 58.)

Identification Reference(s):

BMNH 23283: *Cynarina lacrymalis* (museum specimen); collected from the Miocene of Kurachee, Sind. (Karachi, S. India).

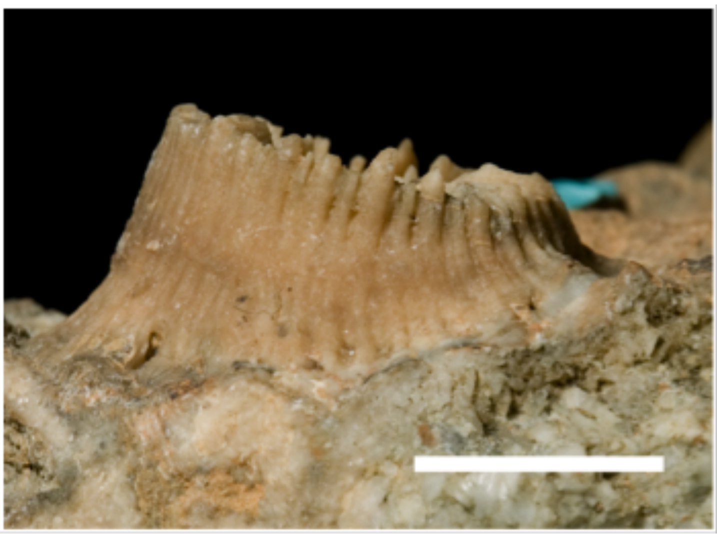
Description: Solitary, tympanoid, attached colony form. Columella: spongy. Forty-nine septa. Septal spacing: 1 per mm. Septa are exsert. Three obvious septal orders (possibly 4?): large, small, medium, small, large etc. Septal lengths: 1st and 2nd orders reach centre (or columella), 3rd order reaches about 3/4 to columella; 4^{th} order septa are not visible inside the calice, but can be discerned when viewed from the outside edge. Septa are different heights when viewed longitudinally at outer calice edge: 1st order = 3.2 mm, 2nd order = 2.8 mm, 3rd order = 1.8 mm, 4th order = 0.9 mm. Distal septal margins: 2-4 large teeth on largest septa, similar number on the medium septa. Septal faces: small rounded bumps/granules. Calice diameter: 18.2 mm (at widest point). Corallite diameter, across widest part of attachment end: 26.5 mm. Budding type: not seen; this coral is solitary and attached so probably does not bud. Cannot see corallum underside because specimen is attached to a platy coral. Septo-costae: extend down the outside of the corallite wall; 1 per mm; are smooth. Height of corallum: 9.7 mm.

Remarks: The specimens in this group are of various sizes, which presumably represent different stages of growth. The reference specimen could be a young specimen, as there are larger specimens within this species group. I have separated this species from the previous one, because this species has large teeth on the septal margins that, when viewed in transverse section, do not stick-out over the edges of the calice. The previous species group has large lobes (rather than dentations) that do stick-out past the calice edge. This group has thicker septa and has a tympanoid growth form. This specimen group resembles *Cynarina lacrymalis*, BMNH specimen: 23283, but is lacking any visible epithelium. Members of this group are often found, in the current collection, attached to the upper surface of platy corals. The group also bears a close resemblance to *Indophyllia macassarensis* Best and Hoeksema, 1987, but is attached, whereas *I. macassarensis* is described as free-living. Further study of the group is needed for a more accurate identification. Features used for identification are: Solitary coral, large septal teeth, pattern, structure and orders of septa (see description for details), tympanoid growth form with large attachment site, first order of septa are much thicker than the others, and large dentations present on the septal margins, near the calice edge.

Specimens: Twelve specimens collected. Reference specimen: LSa1: 213 b (BMNH no. AZ8511).

Figure 57: *Cynarina* sp. 2 – oral surface.

Figure 58: *Cynarina* sp. 2 – side view.



Cynarina sp. 3 *(?cf. lacrymalis)* (Milne Edwards and Haime, 1848)

(Figs. 59 and 60.)

Identification Reference(s):

Veron and Pichon, 1980. p. 238-241, fig. 401; specimens figured are from the Recent of E. Australia. Wells, 1964. pp. 376-378, pl. 20, figs. 1-5, pl. 21, figs. 1-5, pl. 23, fig. 4; figured specimens are from the recent of Gubbins reef, GBR, Queensland and Banc Gail near Nouméa, New Caledonia.

Description: Solitary, infundibuliform colony type; is possibly attached but attachment scar is not well preserved. Columella: spongy. Numerous (>100) septa per corallite. Septa: slightly exsert, especially near outer calice wall. Septal spacing: 1-2 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st and 2nd order septa reach columella, 3rd order reach 1/2 - 3/4 towards columella. Distal septal margins: large toothy projections. Septal faces: covered in pointed granulations. Calice diameter: 22.2 mm. Budding type: extratentacular. Septo-costae: 1-2 per mm; extending down outside of corallum, covered with strands of epitheca. Attachment scar diameter: 5.8 mm. Corallum height: 21.9 mm.

Remarks: This specimen is different from the other two species of *Cynarina* in that it exhibits a different overall colony form (infundibuliform or slightly trochoid), and has a very small attachment point. It also has twice as many septa. It does not have large lobes like *Cynarina* sp. 1, and it is not tympanoid in shape like both *Cynarina* sp. 1 and 2. In Veron and Pichon (1980) they appear to have placed many different growth form morphologies into the same species group, however I believe that the differences between the 3 morphologies of *Cynarina* that are in this collection, warrant their classing as separate species, until intermediate forms are discovered to prove otherwise.

The present day species and the holotype of *Acanthophyllia deshayesiana* (Michelin, 1850) (pictured in Veron and Pichon, 1980) appear to be similar to *C*. sp. 1 in this work, as they share large septal lobes. *C*. sp. 2 is very much like the museum specimen BMNH: 23283, as they share a trochoid growth form and very even septa (although they differ as *C*. sp. 2 does not have any trace of epitheca). *C*. sp. 3 is most similar to one of the specimens depicted in Veron and Pichon, (1980, fig. 401) and also the specimens in Wells, (1964, as listed above), as they share an infundibuliform growth form and epitheca. Until transplantation experiments are done with the modern-day *Cynarina lacrymalis*, or a continuous series of growth forms is found, the level of plasticity of form within this group in the Late Oligocene cannot be implied. The useful identifying features are: the number and orders of septa, the structure of the septal features, the columella type, the external epitheca, septal teeth that lean towards centre of corallite, Infundibuliform growth shape, and a small attachment site.

Specimens: One specimen collected, the reference specimen: 1.4.100 (BMNH no. AZ7514).

Figure 59: *Cynarina* sp. 3 – oral surface.

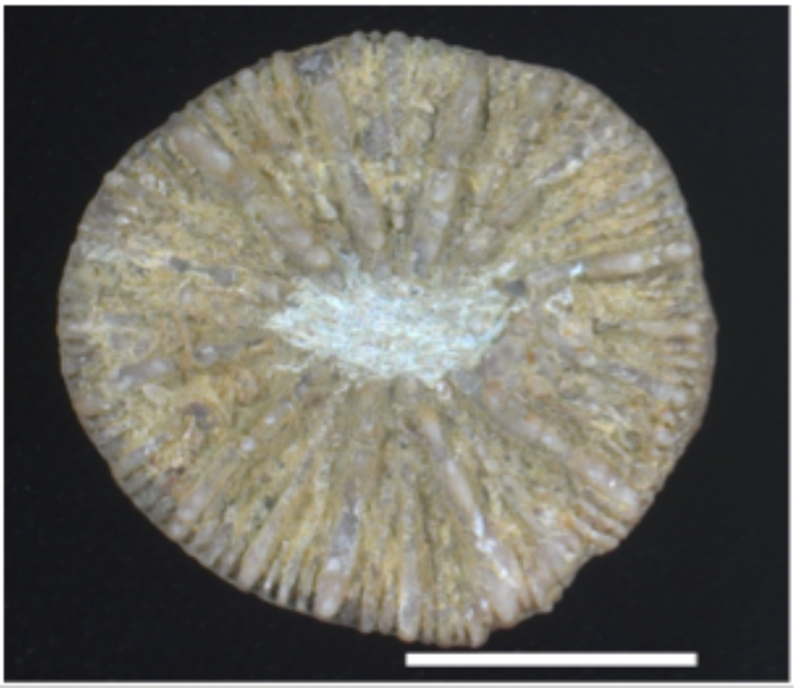
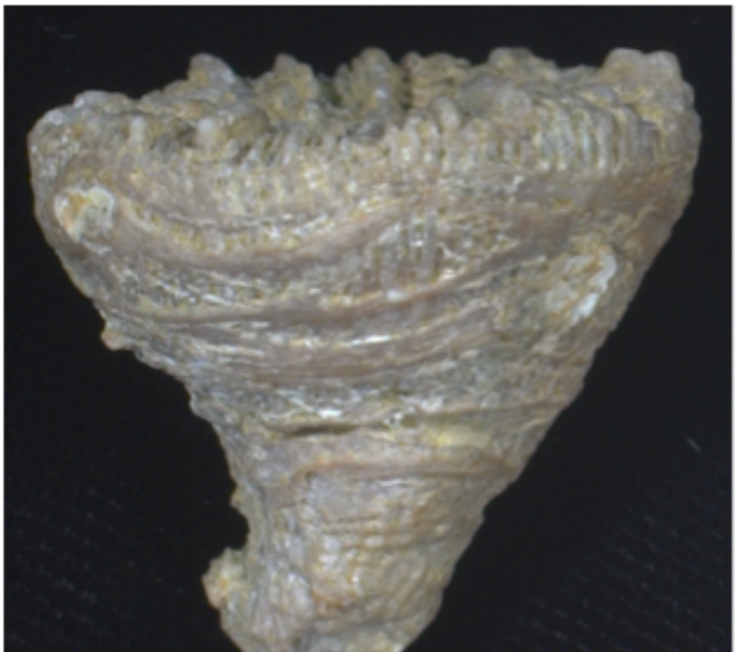


Figure 60: *Cynarina* sp. 3 – side view.



Cyphastrea cf. *japonica* Yabe and Sugiyama, 1932

(Figs. 61 and 62.)

Identification Reference(s):

Veron *et al.*, 1977. pp. 179-181, figs. 357-360; specimens figured are from the Recent of eastern Australia. Veron, 2000. Vol. 3. p. 240; specimens in photographs are from the Recent of Vietnam, the Philippines and Ryukyu Islands, Japan.

Description: Branching colony form. Colony type: plocoid. Columella: not visible (possibly due to poor preservation). Septa: 18-24 per corallite. Septa: exsert, especially 1st order. Septal spacing: 3-4 per mm. Three septal orders present: large (12 total), small (24 total), medium (12 total), small, large etc. Septal lengths: 1st order reaches centre, 2nd order reaches halfway towards centre, 3rd order reaches approximately 0.2 mm towards centre. All septa greatly thickened at calice edge; have an almost pyramidal structure when viewed from above. Distal septal margins: slightly uneven - smooth. Septal faces: smooth (feature poorly preserved). Calice diameter: approximately 1.5-3.0 mm. Calice edges: raised above surface by approximately 1mm. Calices range from circular to oval in shape and are most often elongated in direction of branch growth. Corallite spacing: 2.0-6.3 mm. Calice distribution: not very uniform. Extramural budding. Feint septo-costae present down outside of corallites. Septo-costae: 3-4 per mm. Coenosteum structure: ?porous. Branch diameter at widest point: 19.6 mm; this specimen appears flattened so the original diameter may be less than this value.

Remarks: This specimen group has been attributed to the genus *Cyphastrea* based on the size and structure of the corallites (see above description), that they are septo-thecate and the porous/spiny appearance of the coenosteum. The number of septal orders (3) is the same as observed in *Cyphastrea japonica* (in Veron *et al.*, 1977). Other species of *Cyphastrea* have only 2 septal orders. *C. japonica* is also the only species of *Cyphastrea* that exhibits a branching growth form; the irregular spacing of the corallites is also present in this specimen. The poor preservation detail of this specimen makes it difficult to identify to species level with great certainty hence the "cf." status.

Specimens: Three specimens collected. Reference specimen: SaQ1: 71 (BMNH no. AZ8678).

Figure 61: *Cyphastrea* cf. *japonica* – close up of corallites.

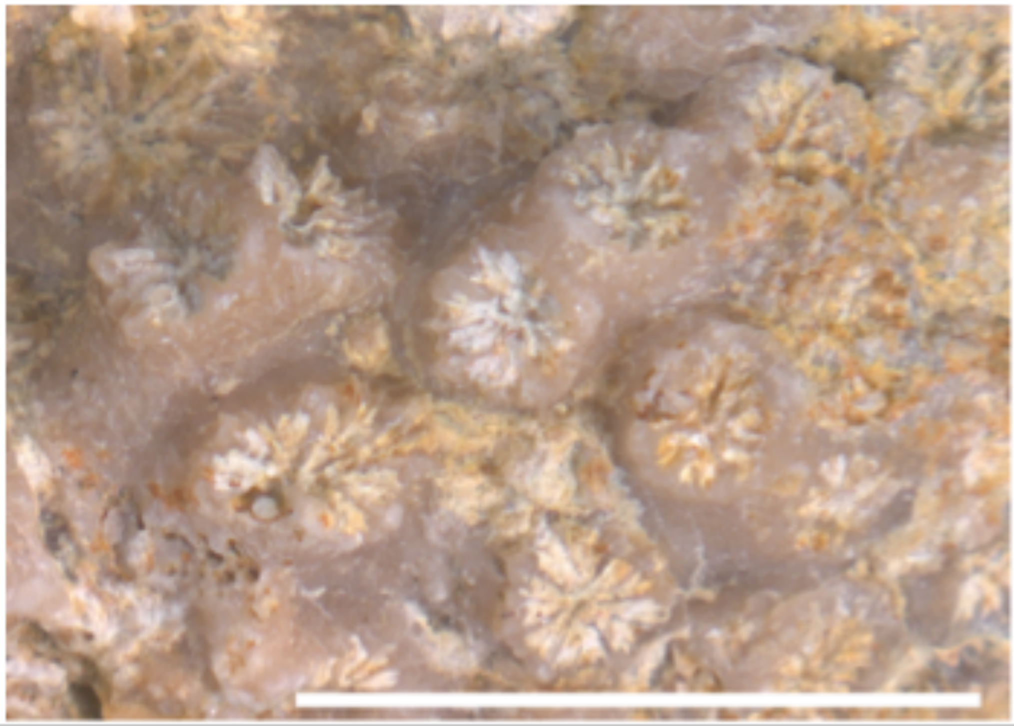
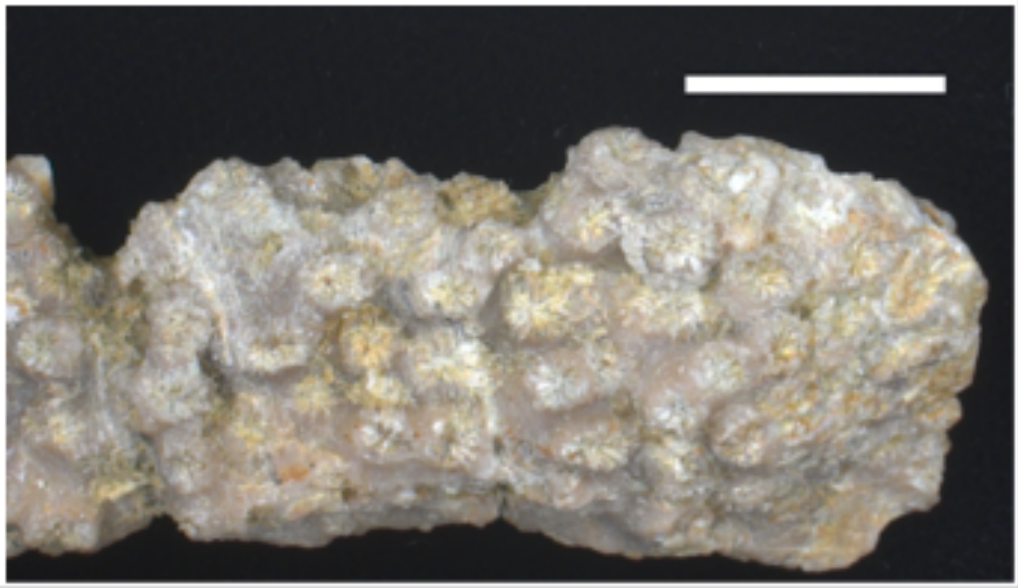


Figure 62: *Cyphastrea* cf. *japonica* – branch.



Dictyaraea aff. *micrantha* Reuss, 1867

(Figs. 63 and 64.)

Identification Reference(s):

Wells, 1954. p. 614, pl. 224, figs. 2a-f; specimens figured are from the Middle Miocene of Bikini Atoll, Marshall Islands. Leloux and Renema, 2007 (*D. micrantha var. spinosa* Is most similar but not the same). p. 29, pl. 42, figs. 3-11; specimens figured are from the Upper Miocene of Duangerreg, Java, Indonesia (*D. micrantha*) and the Miocene of Preanger, Java, Indonesia (specimen numbers: RGM.3977, 3984, 525201, 5252202, 3987, 525203 and 525204).

Description: Finely branching, cerio-plocoid (maybe plocoid) coral. Columella: not visible. Approximately 12 septa per corallite (feature poorly preserved). Septal spacing: 4 per mm. Septa: not exsert. Septa fuse at calice centre, although this could be a diagenetic feature. Two orders of septa (feature poorly preserved): large, small, large, small etc. Septal lengths: 1st septal order reach calice centre, 2nd order reach 1/2 way towards centre; the septal order details were observed in specimen 4.6.1192 b (i), as this feature was not preserved in reference specimen. Distal septal margins: bumpy - porous structure; 2-4 bumps per septum. Septal faces: not preserved well, but possibly porous. Calice diameters: approximately 2.3 mm. Calices: slightly exsert. Corallite spacing: 2.0-3.8 mm. Corallites: rounded-hexagonal shape. Corallites: slightly extended in one direction, possibly in direction of growth. Extramural budding. Coenosteum: smooth. Branch diameters: 3.2-4.3 mm.

Remarks: This specimen should definitely be allied with the Poritidae, as it's corallites and septa have a porous structure similar to that seen in other members of the family. This specimen group has been attributed to the genus *Dictyaraea* because of the porous structure of the corallum, it is finely branching, and it has 12 septa, similar in appearance to that exhibited by *Porites*. This specimen bears a similarity in corallite appearance to *Goniopora fruticosa* Saville-Kent, 1893 (in Veron and Pichon, 1982). However, it is most similar to *Dictyaraea micrantha* (in Wells, 1954; Leloux and Renema, 2007), although the present specimen is not ramose, and has much more delicate branches. I cannot find a species identical to this in the literature but have identified it as *Dictyaraea* aff. *micrantha* as this is the most similar species.

Specimens: Eight specimens collected. Reference specimen: 2.5.555 b (BMNH no. AZ7845).

Figure 63: *Dictyaraea* aff. *micrantha* – close up of branches.

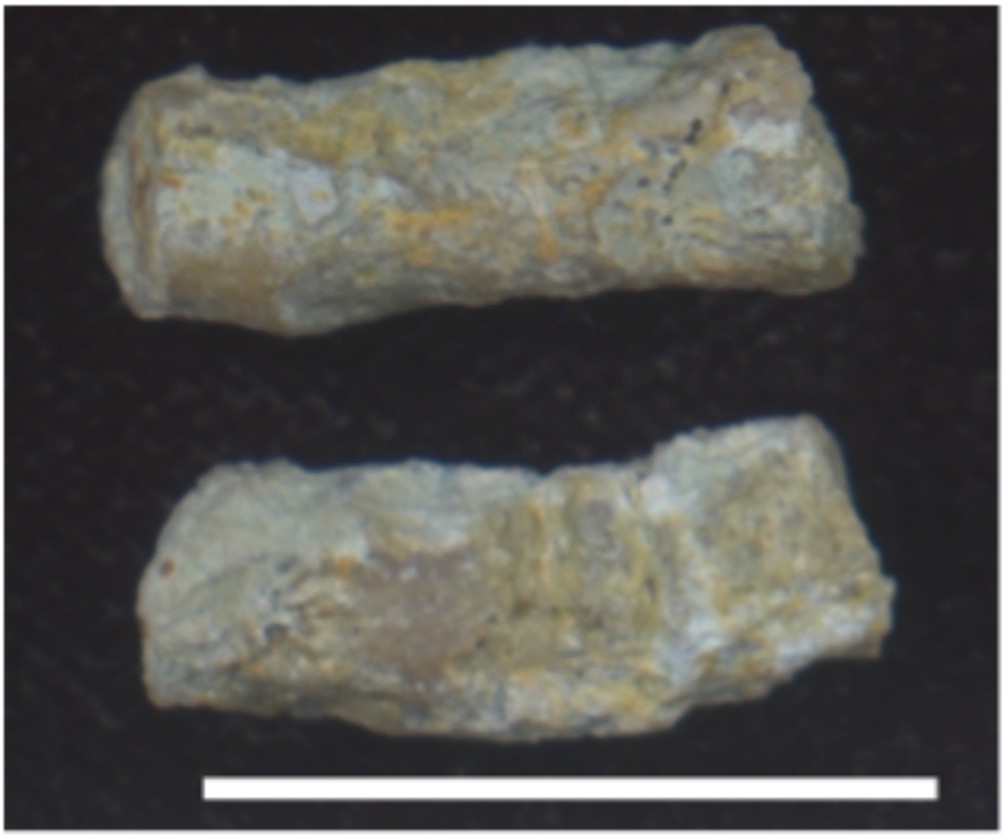
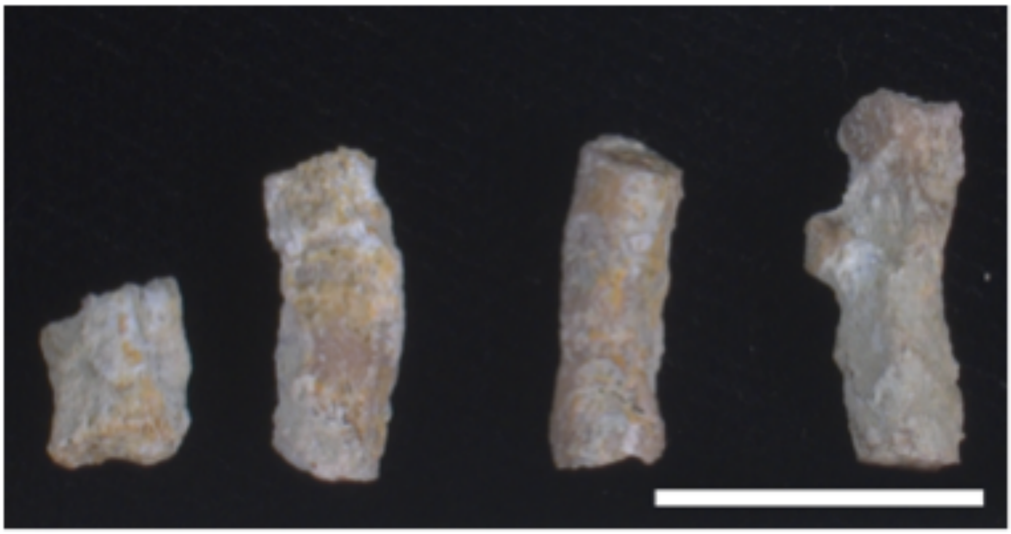


Figure 64: *Dictyaraea* aff. *micrantha* – 4 branches.



Diploastrea* aff. *coronata Schuster, 2002

(Figs. 65, 66 and 67)

Identification Reference(s):

Schuster, 2002. p. 25, and pp. 50-51, pl. 8, fig. 3; specimen figured is the holotype from the Late Oligocene of Abadeh, Iran.

Description: ?Massive colony form (feature poorly preserved). Colony type: cerio-plocoid. Columella: spongy. Approximately 50 septa per corallite; value has been estimated, as no complete corallites observed. Septa: slightly exsert at outer calice wall (feature poorly preserved). Septal spacing: 2-3 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order septa reach columella, 2nd order almost redundant (<1mm). Distal septal margins: uneven (feature poorly preserved). Septal faces not well preserved, as there is sediment infilling calice. Calice diameters: approximately 6.0-7.0 mm; this was hard to measure accurately due to no complete corallites. Corallite spacing: 7.2-11.6 mm. Budding type: not seen. Extracalicular, vesicular dissepiments. This specimen is very poorly preserved, especially the external features.

Remarks: This specimen has similar measurements to those given for *D. coronata* in Schuster (2002), but fewer orders of septa are visible in the current specimen, and the calice diameter is at the larger end of the given range. The poor-preservation of the reference specimen means that I cannot be completely certain of this attribution. Identifying features are: the columella is well developed, the septal pattern, and the size and layout of the corallites.

Specimens: One specimen collected. Reference specimen: 1.1.2 (BMNH no. AZ7460).

Figure 65: *Diploastrea* aff. *coronata* – internal corallite close up.

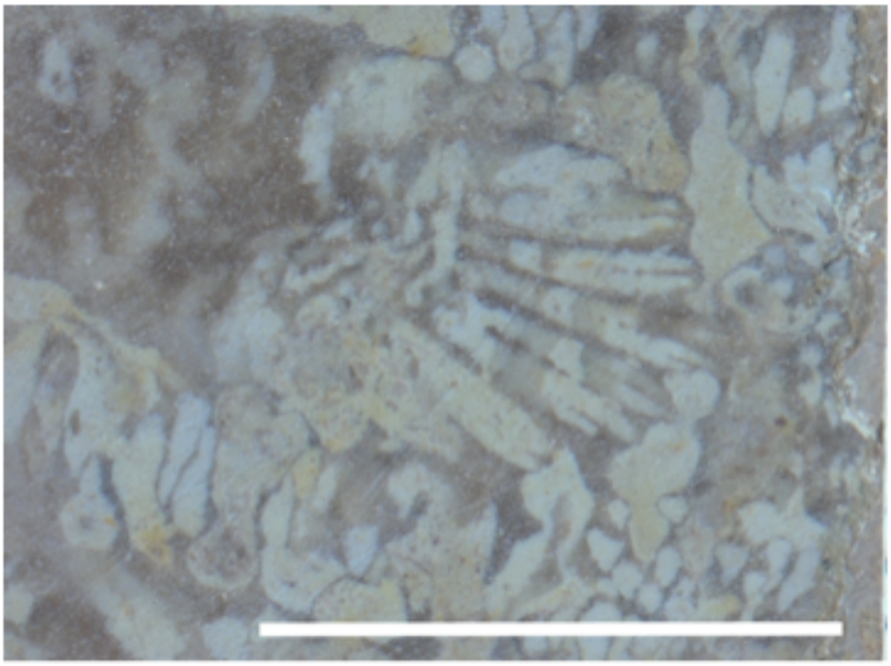


Figure 66: *Diploastrea* aff. *coronata* – internal corallites.

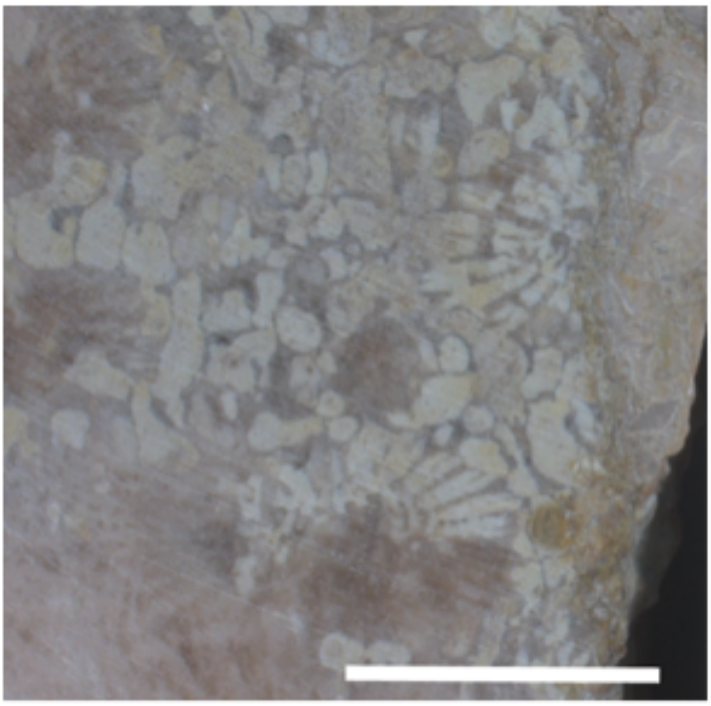
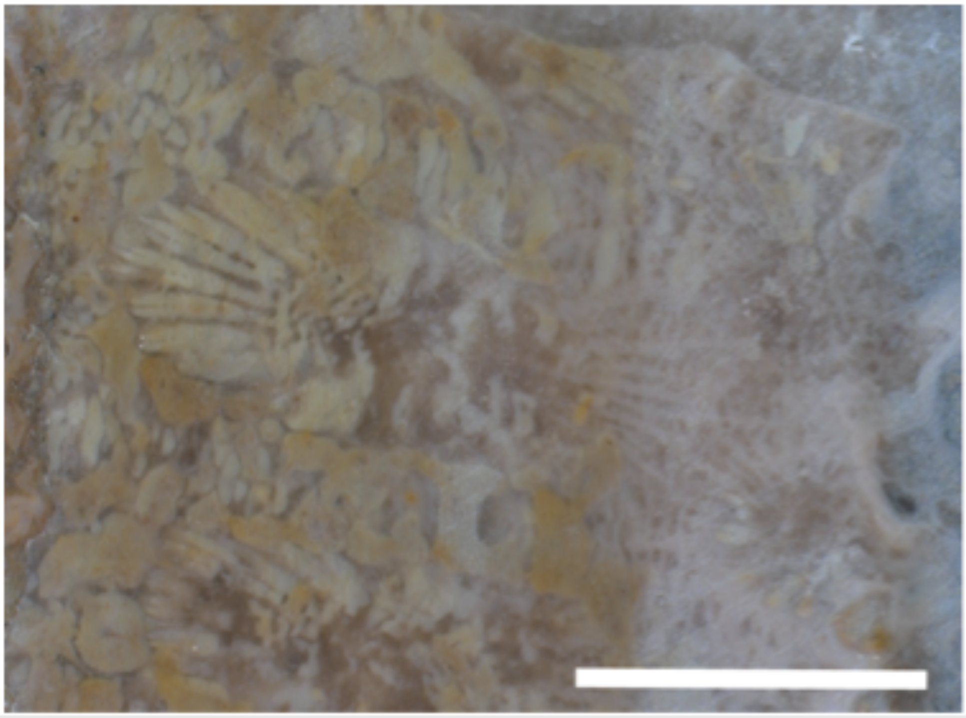


Figure 67: *Diploastrea* aff. *coronata* – internal corallite & dissepiments.



Echinophyllia cf. *echinata* Saville-Kent, 1871

(Figs. 68 and 69.)

Identification Reference(s):

Veron and Pichon, 1980, pp. 307-310, figs. 536-538; specimens figured are from Big Mary Reef, Yorke Island, the Murray Islands and Ashmore Reef, Eastern Australia.

Fits description of *Echinophyllia* Kluzinger, 1879 *in* Wells, 1956, p. F419; figured specimen is from the Recent of Japan. Specimen is also similar to *Echinophyllia (Pectinia) maxima* Moll and Borel-Best, 1984 *in* Veron, 2000. Vol. 2. p. 349 - as *Pectinia maxima;* specimens figured are from the Recent of the Calamian Islands, Philippines and Ryukyu Islands, Japan.

Description: Platy/foliose colony form. Colony type: plocoid. Columella: spongy (feature poorly preserved). Approximately 14-16 septa per corallite.

Septa: highly exsert, especially 1st order. Larger septa have ridges along sides (extending parallel to septal margins). Septal spacing: 1-2 per mm. Approximately 4 orders of septa: 4-6 large septa interspersed by 1-6 very small, small and medium septa (interspersing septa are not in a regular pattern). Septal lengths: 1st order septa reach corallite centre, other orders reach to ≤3 mm from centre. Distal septal margins: irregular dentations along all septo-costae. Septal faces: covered in small pointed, conical projections/ dentations. Calice diameters: approximately 9.0 mm; this was hard to measure as the corallites lack defined walls. Calices: irregularly spaced, as are the larger septo-costae. Corallite spacing: 6.2-27.0 mm. Intramural budding. Coenosteum covered with septo-costae, but appears smooth between septo-costae. Coenosteum may be vesicular; it has some areas that are thicker than others, as if there is an air bubble under surface. Septo-costae extend in same direction over coenosteum, except at corallite centres where they bend round towards columella. Some septo-costae bifurcate. From positioning of adjacent corallites along a slight curve, is likely that this part of the coral grew around a central point, so it may exhibit circumoral growth. Underside of corallum: smooth, with feint costae in places (approximately 2 per mm). Plate thickness: approximately 0.7-5.9 mm.

Remarks: This coral fits well with the description of *Echinophyllia* given by Wells (1956). The most useful features for identification are: confluent septo-costae, at least 4 orders of septo-costae, intratentacular budding, possible circumoral growth, a vesicular coenosteum, distal septal margins dentations, a lack of definite corallite walls, and a trabecular columella.

The specimen looks very similar to *Pectinia (Echinophyllia) maxima* in Veron (2000): the scale is the same, but the septa vary more in size and spacing in this specimen. Veron has changed the genus of *P. maxima* from *Echinophyllia* to *Pectinia* for the figured coral, but has failed to give any reasoning or references for this decision; given this, I would regard it as still belonging to the genus *Echinophyllia*. The present specimen shows most similarity to *Echinophyllia echinata* in Veron and Pichon (1980), as it has more irregularly sized septa, approximately the same number of septal orders, and in some of the specimens here, has very noticeable distal septal margins dentations.

Specimens: Eighteen specimens collected. Reference specimen: 4.8.1271 (BMNH no. AZ8286).

Figure 68: *Echinophyllia* cf. *echinata* – close up of corallites.

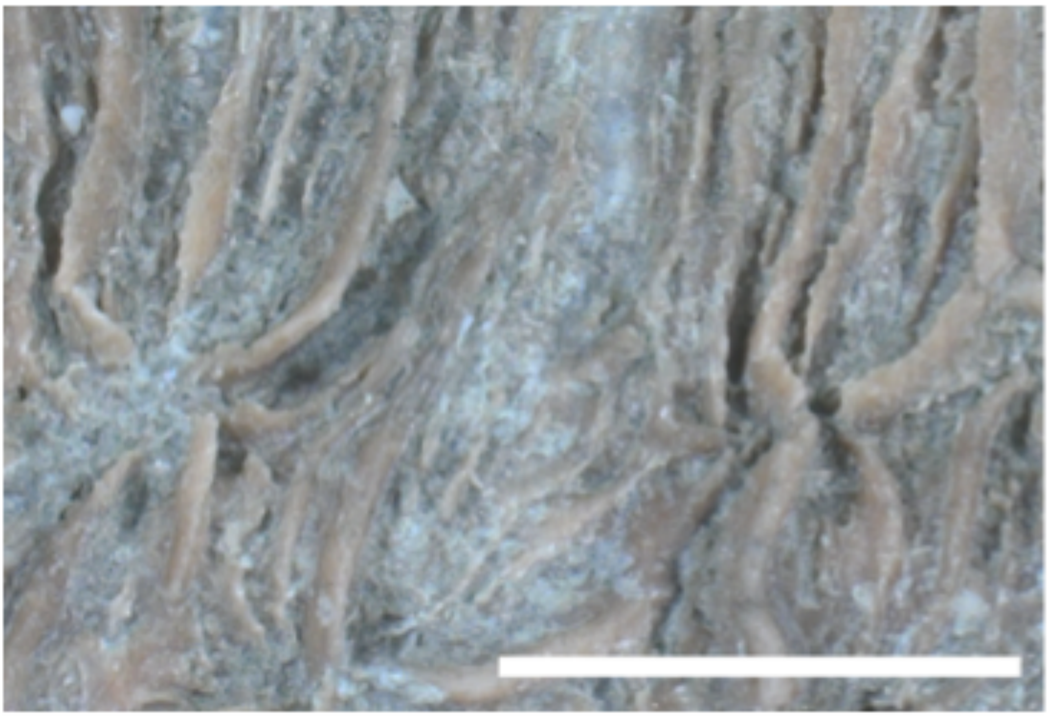
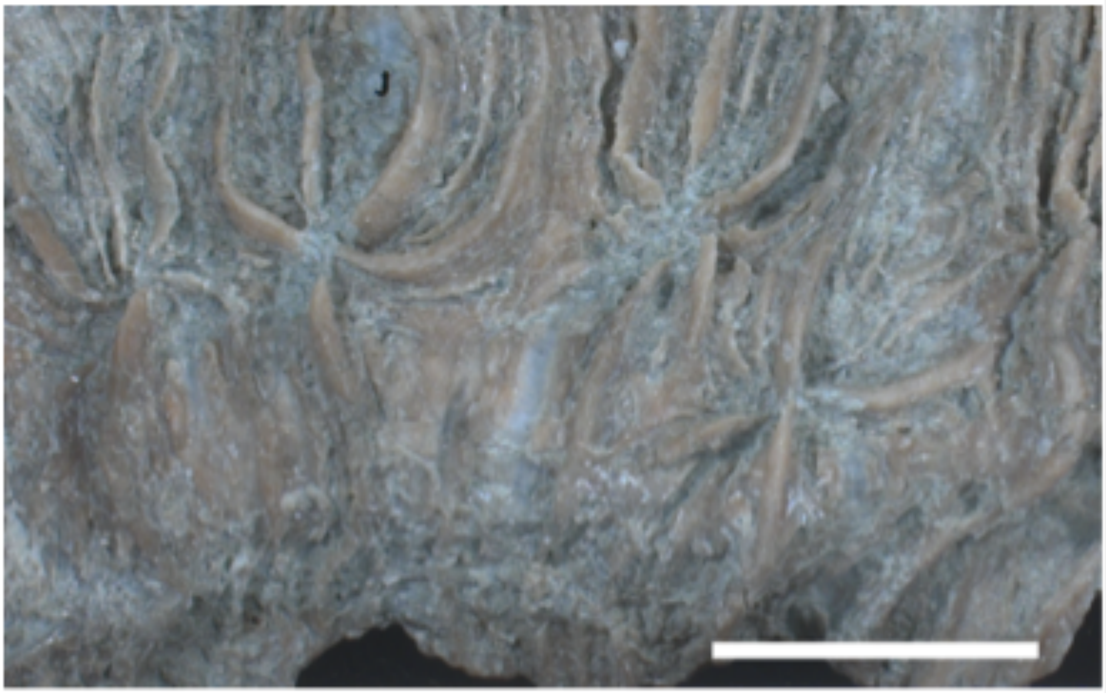


Figure 69: *Echinophyllia* cf. *echinata* – corallites.



Echinophyllia sp. 1 Kluzinger, 1879

(Figs. 70 and 71.)

Identification Reference(s):

Wells, 1956. p. F419; figured specimen is from the Recent of Japan.

Description: Platy colony form. Colony type: cerioid. Columella: spongy. Approximately 20 septa per corallite (feature poorly preserved). Septal spacing: 1-2 per mm. Septa: highly exsert. Two to three orders of septa (feature poorly preserved): large, medium, small, medium, large etc. Septal lengths: large and medium septa reach columella, smaller septa reach ≤4mm from columella. Distal septal margins: uneven, possibly with numerous toothy projections that have been broken. Septal faces: very lumpy (feature poorly preserved). Calice diameters: approximately 32 mm.

Hard to tell where calice walls are, as septo-costae are confluent. Corallite spacing: 23.5- 40.8 mm. Coenosteum: uneven/lumpy. Possible vesicular dissepiments (feature poorly preserved). Underside of corallum has costae; 1-2 per mm. Plate thickness: 1.2-15.9 mm.

Remarks: This specimen looks like a smaller, colonial version of *Fungophyllia monstrosa* Gerth, 1923. It has much larger corallites than other *Echinophyllia* sp. This is possibly a new species, as I have not seen it in any of the literature, however it fits within the description of the genus *Echinophyllia* in Wells (1956), so I am confident of the generic attribution. Features used for identification are: it shows circumoral budding, it is colonial, it has a spreading, explanate corallum, and it has confluent septo-costae.

Specimens: One specimen collected. Reference specimen: PP1: 314 (BMNH no. AZ8604).

Figure 70: *Echinophyllia* sp. 1 – close up of corallite.

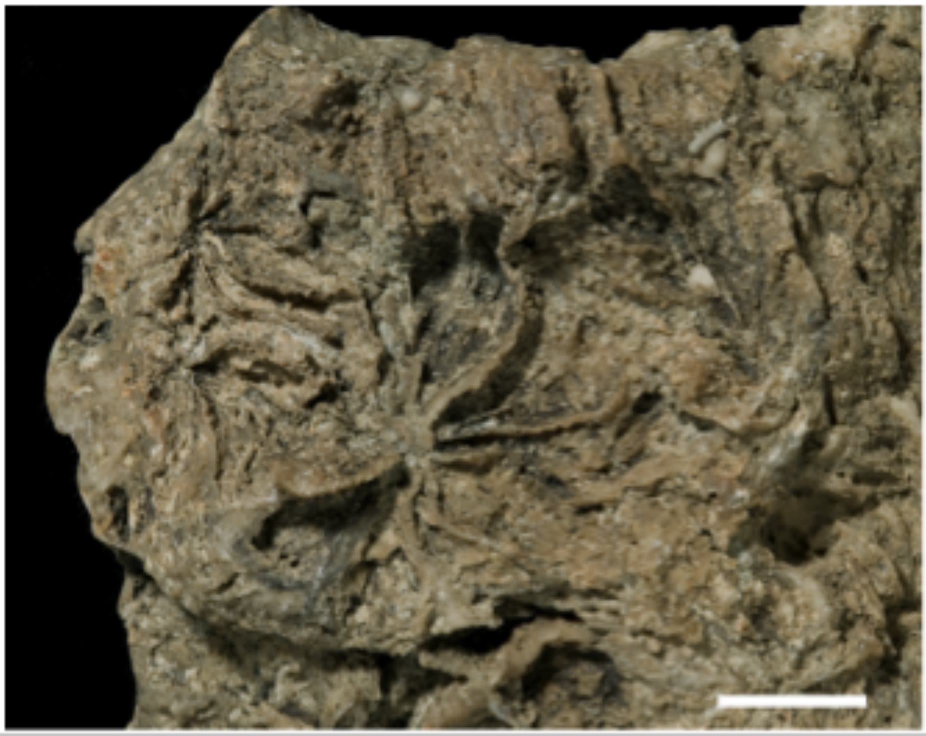


Figure 71: *Echinophyllia* sp. 1 – whole specimen.

Echinopora aff. *pelarangensis* Gerth, 1923

(Figs. 72 and 73.)

Identification Reference(s):

Gerth, 1923, p. 90-91, pl. 5, fig. 7; figured specimen is from the Miocene of Borneo. Leloux and Renema, 2007, p. 30, pl. 46, figs. 11-14; figured specimens are: syntypes from the Miocene of Indonesia (RGM. 43100 and 43101).

Description: Thin, platy colony form. Colony type: plocoid. Columella: spongy. Septa: 20-30 per corallite. Septa: exsert. Septal spacing: 2-3 per mm. Three septal orders: large, small, medium, small, medium, small, large etc. Septal lengths: 1st order reaches centre, 2nd order reaches 1/3 to centre, 3rd order reaches approximately 0.2 mm towards centre. Large septa range from 4-6 per corallite. Distal septal margins: straight and smooth. Septal faces: small bumps/projections (feature poorly preserved). Calice diameters: approximately 4.5 mm. Calices: roughly circular, but are distorted (not all in same direction). Calices situated at top of rounded, cone-shaped mounds. Corallite spacing: 9.4-18.6 mm. Extramural budding. Coenosteum: smooth, but covered in septo-costae. Septo-costae: 2-3 per mm. Septo-costae extend ≤9.2 mm from calice wall. Septo-costae extend outwards from calice and occasionally fuse when they meet adjacent corallite septo-costae. Underside: deeply striated with costae; 1-2 per mm. Plate thickness: 2.4-6.7 mm. The platy structure is not entirely flat; it undulates irregularly.

Remarks: This specimen is most similar to *Echinopora pelarangensis*, but it differs as the septo-costae in this species appear smoother than those in the literature, and the calices are more irregularly spaced. Full visual comparison to the specimens in the Gerth Collection (Leloux and Renema, 2007; Gerth, 1923) is warranted.

Specimens: Twenty-four specimens collected. Reference specimen: LSa: 2002 (BMNH no. AZ8477).

Figure 72: *Echinopora* aff. *pelarangensis* – close up of corallite.

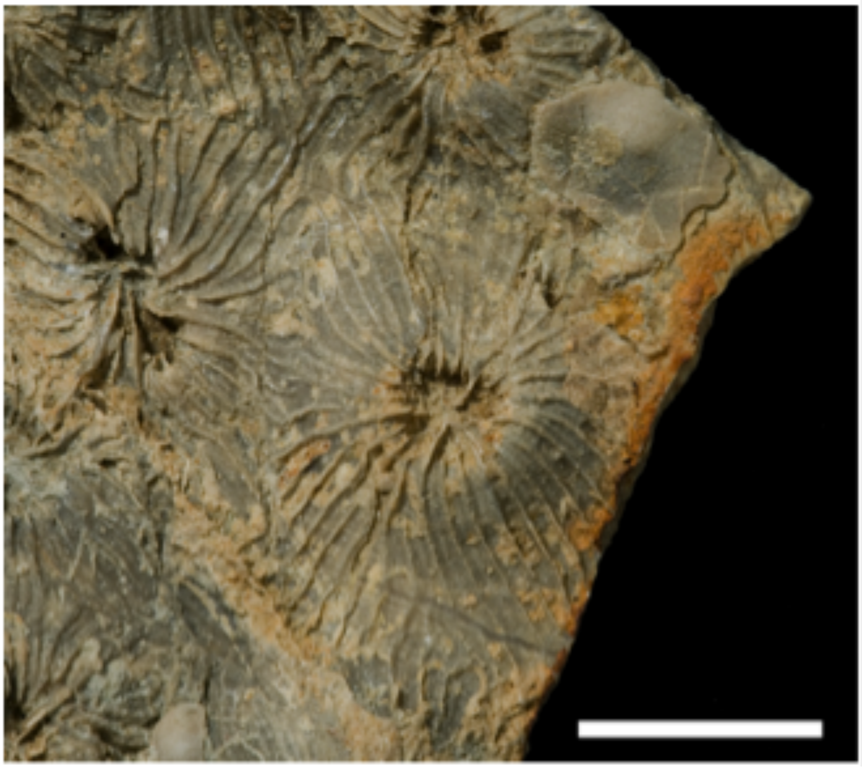
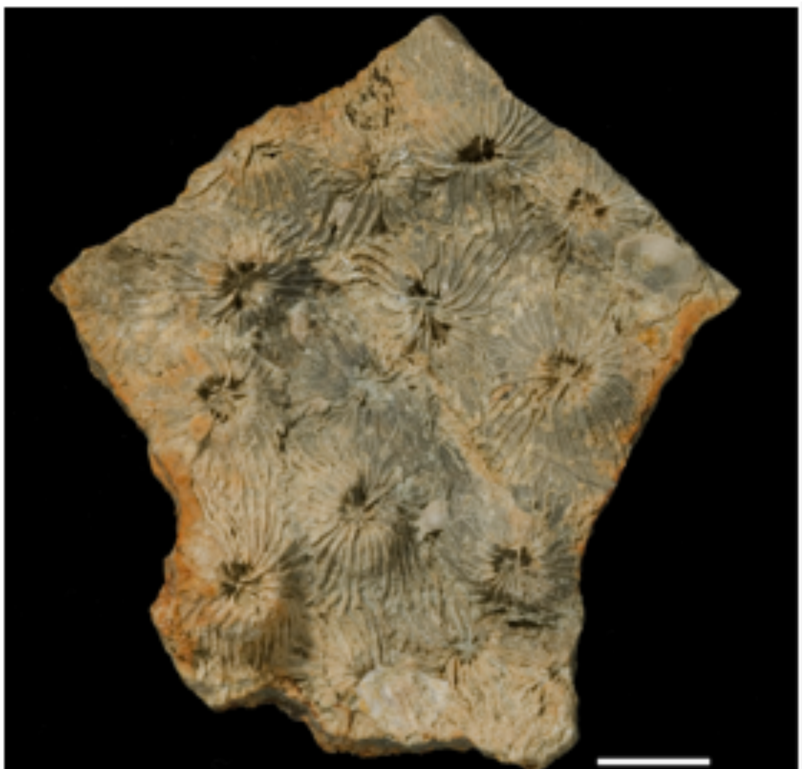


Figure 73: *Echinopora* aff. *pelarangensis* – whole specimen.



Echinopora pelarangensis Gerth, 1923

(Figs. 74 and 75.)

Identification Reference(s):

Gerth, 1923, p. 90-91, pl. 5, fig. 7; figured specimen is from the Miocene of Borneo. Leloux and Renema, 2007, p. 30, pl. 46, figs. 11-14; figured specimens are: syntypes from the Miocene of Indonesia (RGM. 43100 and 43101).

Description: Platy/Massive colony form. Colony type: plocoid. Columella: spongy. Approximately 20-30 septa per corallite. Septa: exsert. Septal spacing: 2-3 per mm. Only 1 distinguishable order of septa (feature poorly preserved). Septa reach the centre of the calice. Distal septal margins: pointed teeth/spines. Septal faces: lumpy (feature poorly preserved). Calice diameters: 1.8-3.2 mm. Calices: located at the top of rounded, conical mounds. Corallite spacing: 4.4-7.6 mm. Coenosteum covered with septo-costae. Septo-costal spacing: 1-2 per mm. Possible vesicular dissepiments (feature poorly preserved). Underside of corallum: not visible, as there is a *Pachyseris* coral encrusted on the underside. Plate thickness: approximately 9.8-16.3 mm. Septo-costae extend from centre of calice to 1.9-5.9 mm. Bumps/spines observed on septa are continuous along septo-costae.

Remarks: This specimen appears to be the same as the specimens observed in the above literature references. It has the same number of septa and the same corallite spacing. It also has the same lumpy-looking septo-costae. I therefore believe this to be *Echinopora pelarangensis*. However, this specimen is not very well preserved.

Specimens: Two specimens collected. Reference specimen: 5.-.1374 (BMNH no. AZ8383).

Figure 74: *Echinopora pelarangensis* – close up of corallites.

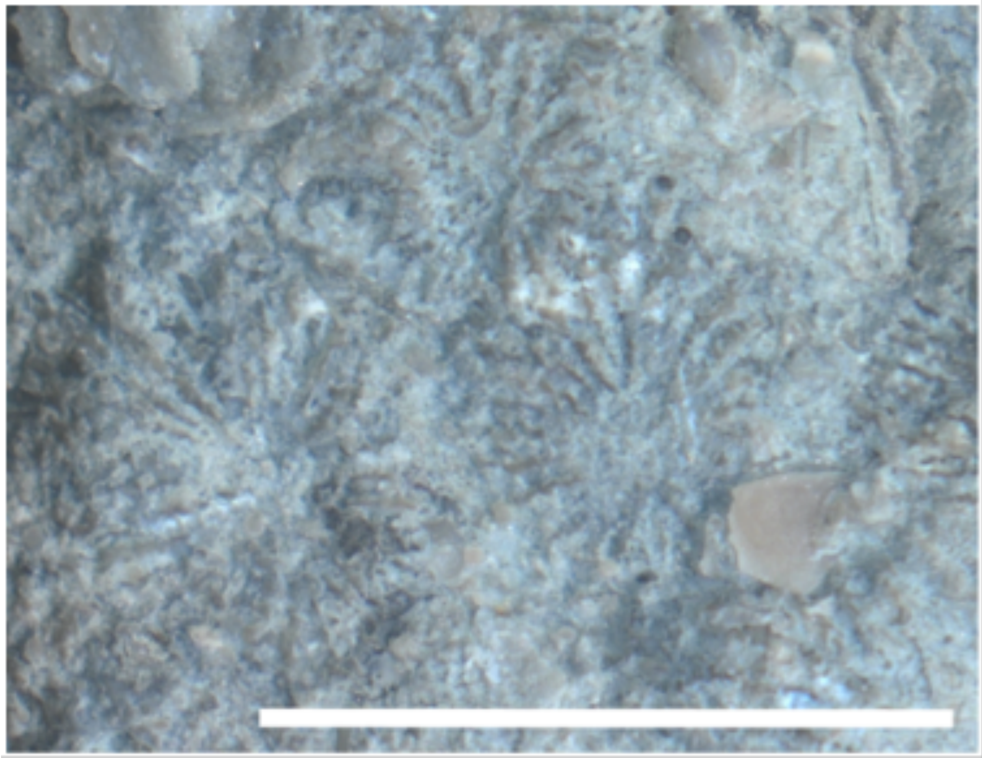
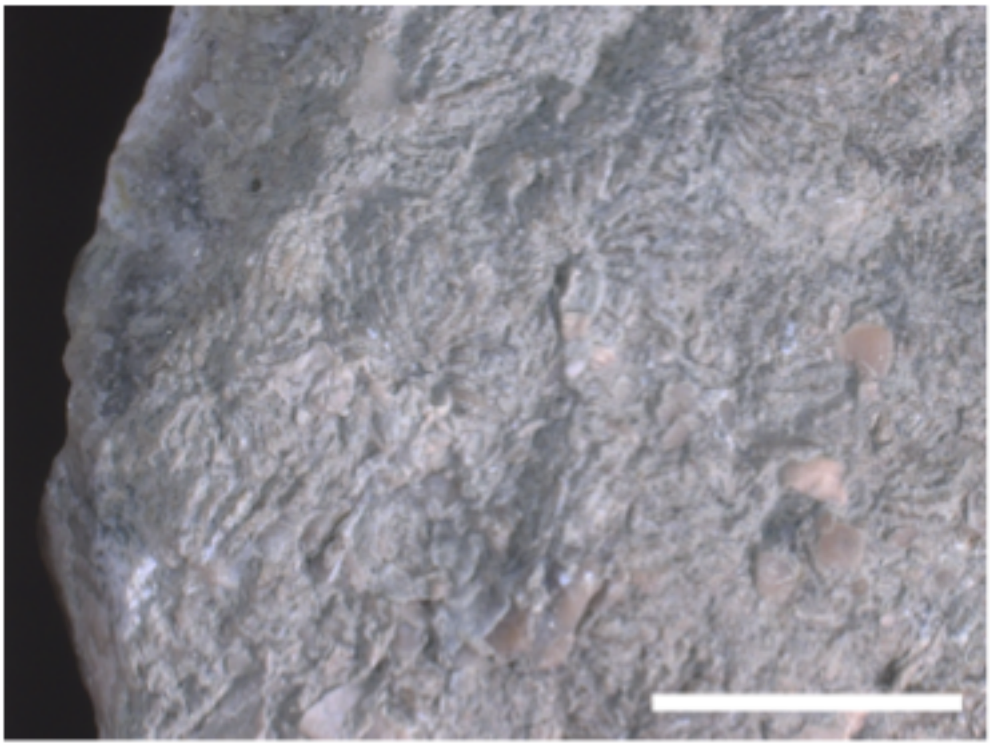


Figure 75: *Echinopora pelarangensis* – oral surface.



?*Favia* cf. *laxa* Kluzinger, 1879

(Figs. 76 and 77.)

Identification Reference(s):

Veron *et al.*, 1977, pp. 23-25, figs. 23-27; figured specimens are from the Recent of eastern Australia, inclusive of the holotype (fig. 23).

Description: Massive colony form. Colony type: ?sub-plocoid; the surface of this specimen is poorly preserved. Columella is spongy. Approximately 20-30 septa per corallite. Septa: slightly exsert. Septal spacing: 1-2 per mm. One visible order of septa, possibly 2? (feature poorly preserved). Most septa reach columella; some extend to halfway or less. Distal septal margins: uneven, possibly with toothy projections. Septal faces poorly preserved. Calice diameters: 5.6-8.9 mm. Calices: oval-shaped. Cannot tell if calices are exsert, as the surface is poorly preserved. Corallite spacing: 7.2-12.6 mm. ?Possible extracalicular, vesicular dissepiments. Septo-costae extend outside calice; 0-1 per mm. Underside of corallum: not visible.

Remarks: This specimen has very poor preservation of features and has been attributed to *F. laxa* due to its resemblance to the Holotype (observed in figure 23. p. 24 of Veron *et al.*, 1977). However the poor preservation makes accurate identification nearly impossible for this specimen.

Specimens: One specimen collected, the reference specimen: 1.1.1 (BMNH no. AZ7457).

Figure 76: ?*Favia* cf. *laxa* – close up of internal corallites.

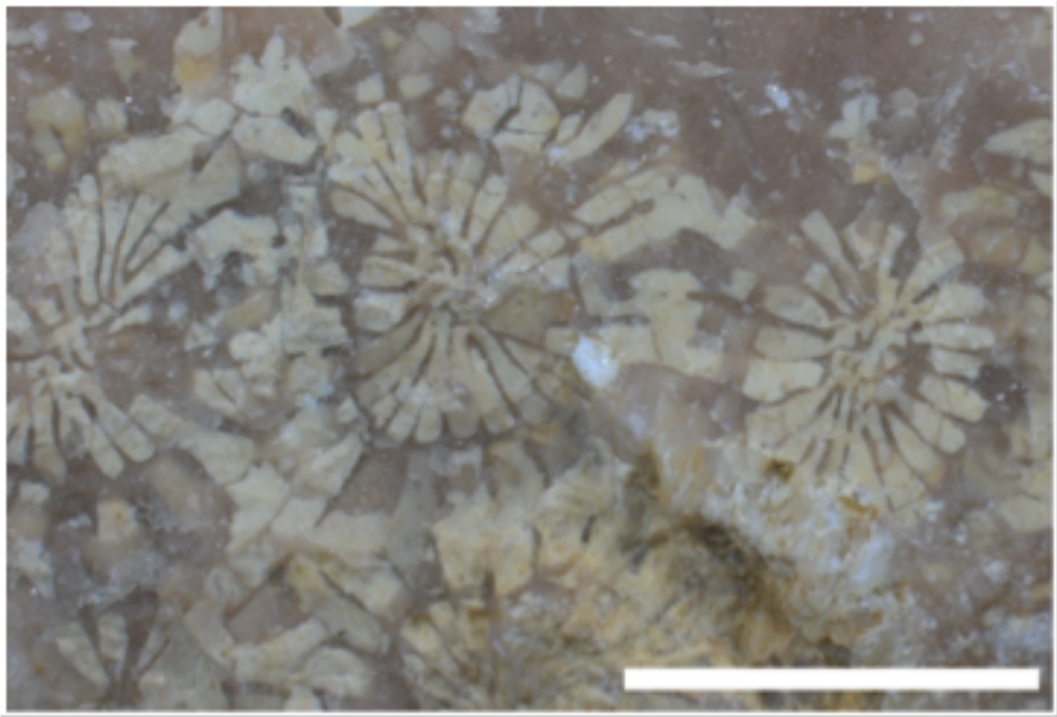
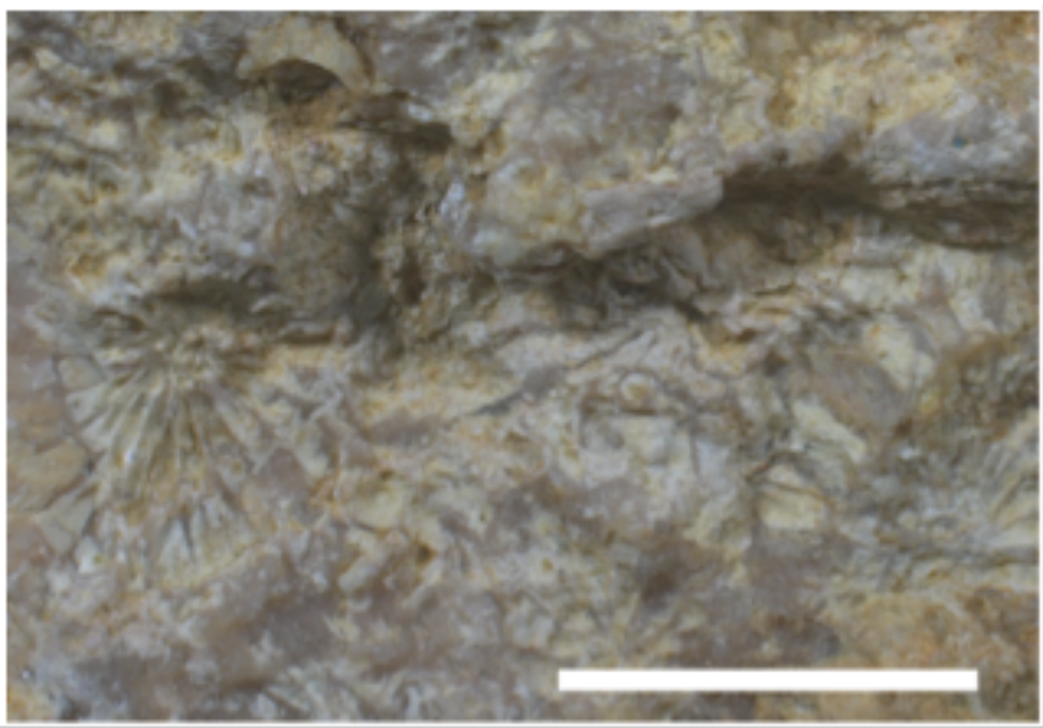


Figure 77: ?*Favia* cf. *laxa* – external corallites.



Favia cf. *lizardensis* Veron, Pichon and Wijsman-Best, 1977

(Figs 78 and 79.)

Identification Reference(s):

Veron *et al*., 1977, pp. 45-48, figs. 74-77; figured specimens are the holotype from MacGillivray Reef, and other specimens from the Recent of eastern Australia. Reference specimen also compared to type specimen: BMNH 1977.1.1.2: *Favia lizardensis* (holotype) collected from Macgillivray Reef nr. Lizard Island, GBR, Australia (7m depth).

Description: Massive colony form. Colony type: plocoid. Columella: spongy. Approximately 25-35 septa per corallite. Septa: slightly exsert at outer wall of calice. Septa thicken near columella. Septal spacing: 0-2 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st septal order reach columella, 2nd order reaches 1/3-1/2 way towards columella. Distal septal margins: slightly uneven/toothy. Septal faces: not preserved well as there is sediment filling calice. Calice diameters: 5.3-11.3 mm. Calices: slightly exsert. Calice wall is thin at top edge; thickens towards coenosteum. Calice centres: either below or at level of coenosteum. Corallite spacing: 7.7-16.7 mm. Corallites: circular to oval in shape. Corallite walls extend approximately 4 mm above coenosteum. Coenosteum: smooth, but covered with septo-costae, extending outwards from corallites. ?Extramural budding. Septo-costal spacing: 0-1 per mm. Septo-costae of adjacent corallites occasionally meet. Vesicular dissepiments. Underside of corallum: not visible.

Remarks: This specimen fits well with the description of *F. lizardensis* in Veron *et al*., (1977). The reference specimen appears most similar to Figure

76. on p. 47 in the latter reference. It has thin thecae and septa, the same size and shape corallites; the septal numbers per corallite are the same, and it shares a smooth coenosteum. Intramural budding was not observed, so extramural budding has been assumed, however budding type cannot always be distinguished accurately in fossil specimens.

Specimens: One specimen collected, the reference specimen: 1.6.174 (BMNH no. AZ7573).

Figure 78: *Favia* cf. *lizardensis* – close up corallites.

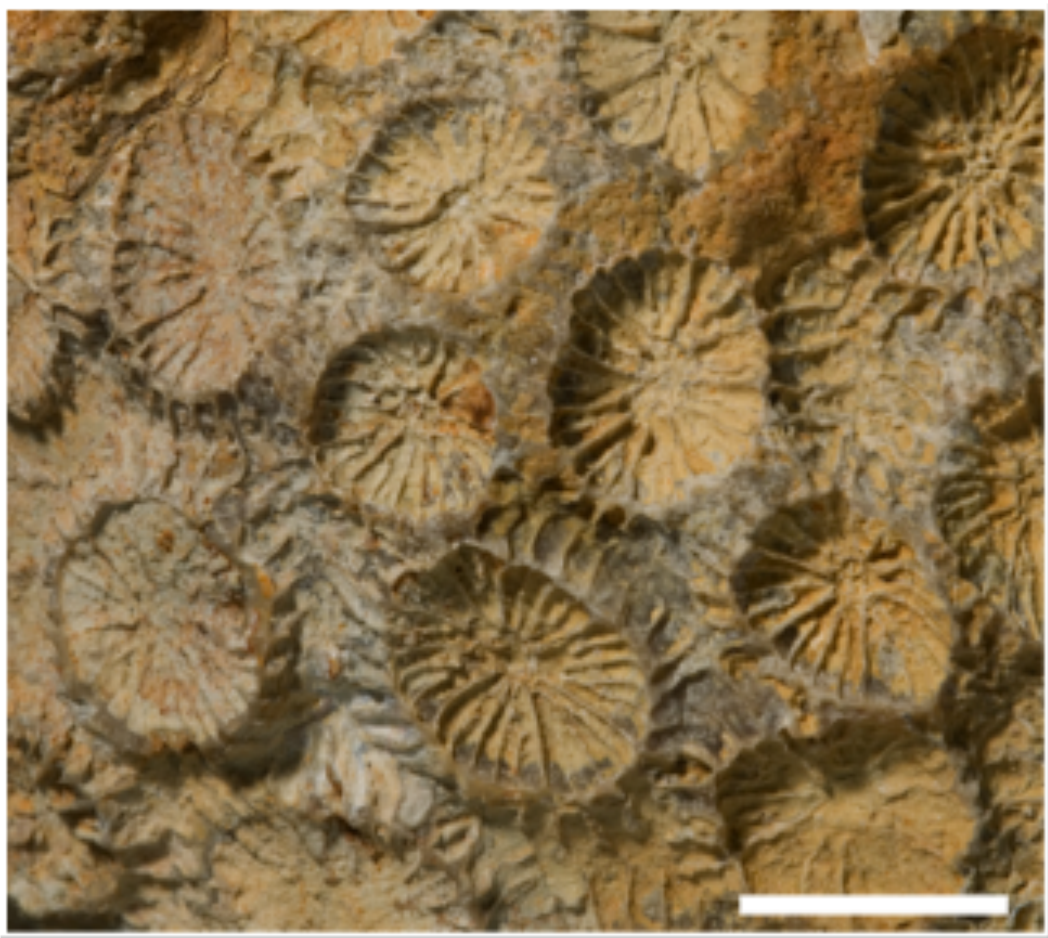


Figure 79: *Favia* cf. *lizardensis* – whole specimen.

Favites aff. *chinensis* Verrill, 1866

(Figs. 80 and 81.)

Identification Reference(s):

Veron *et al.*, 1977, pp. 52-54, figs. 83-88; figured specimens are from the Recent of eastern Australia, inclusive of the holotype (fig. 88). Veron, 2000. Vol. 3, p.143; specimens are from the Great Barrier Reef, Australia and the Calamian Islands, Philippines.

Description: ?Massive colony form; this specimen's shape is poorly preserved. Colony type: cerioid. Columella: spongy. Twenty-four or more septa per corallite (feature poorly-preserved). Septa: not exsert. Septa mostly line up across walls. Septal spacing: 1 per mm. Two septal orders: large, small, large, small etc. Septal lengths: 1st order reaches columella, 2nd order reaches near to columella but does not touch. Distal septal margins: uneven, possibly with toothy projections but most are now broken. Septal faces: smooth or slightly lumpy (feature poorly-preserved). Calice: 4.9-18.4 mm. Corallite spacing: 7.0-14.5 mm. Corallite shape may have altered during diagenesis; all corallites are wider in same direction. Possible vesicular dissepiments (feature poorly-preserved). Underside of corallum: smooth but uneven, mainly covered by encrusters. “Plate” thickness: 7.3-23.4 mm.

Remarks: This specimen bears a resemblance to *F. chinensis* in Veron (2000, p. 143). The calice measurements are different to those in Veron *et al.* (1977), but this may be due to the specimen having been warped during preservation. This group should also be compared to *Favites ambigua* (Zuffardi-Comerci, 1934) described in Schuster (2002), as it appears similar but has less septa and slightly different calice diameter values. The preservation of this specimen makes it difficult to identify.

Specimens: Three specimens found. Reference specimen: SaQ1: 128 (BMNH no. AZ8649).

Figure 80: *Favites* aff. *chinensis* – close up of external corallites.

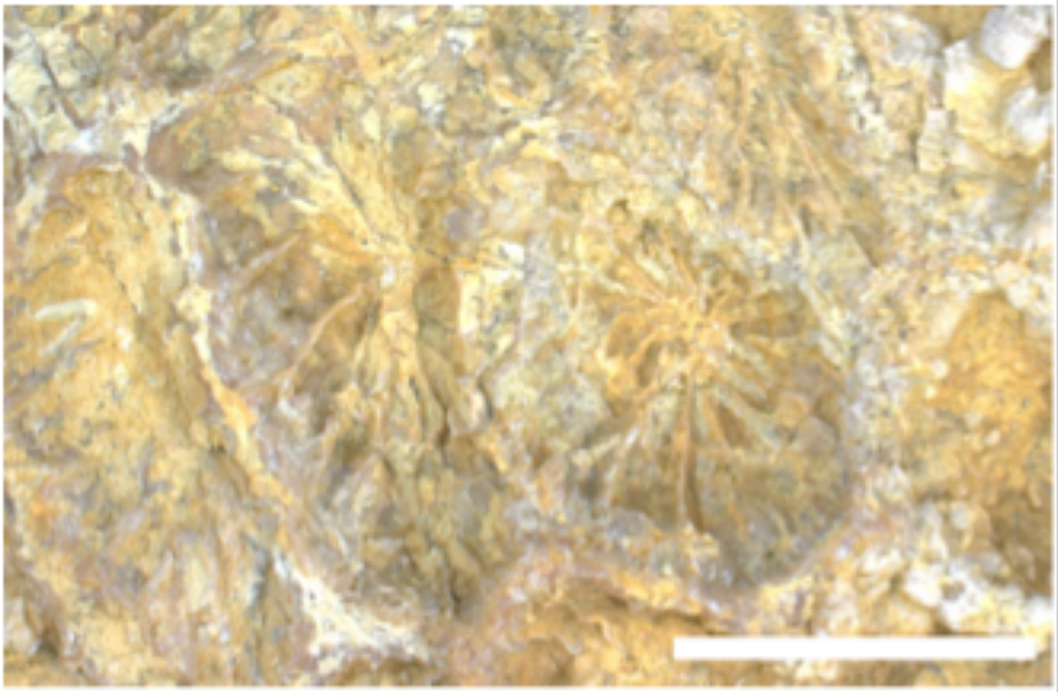
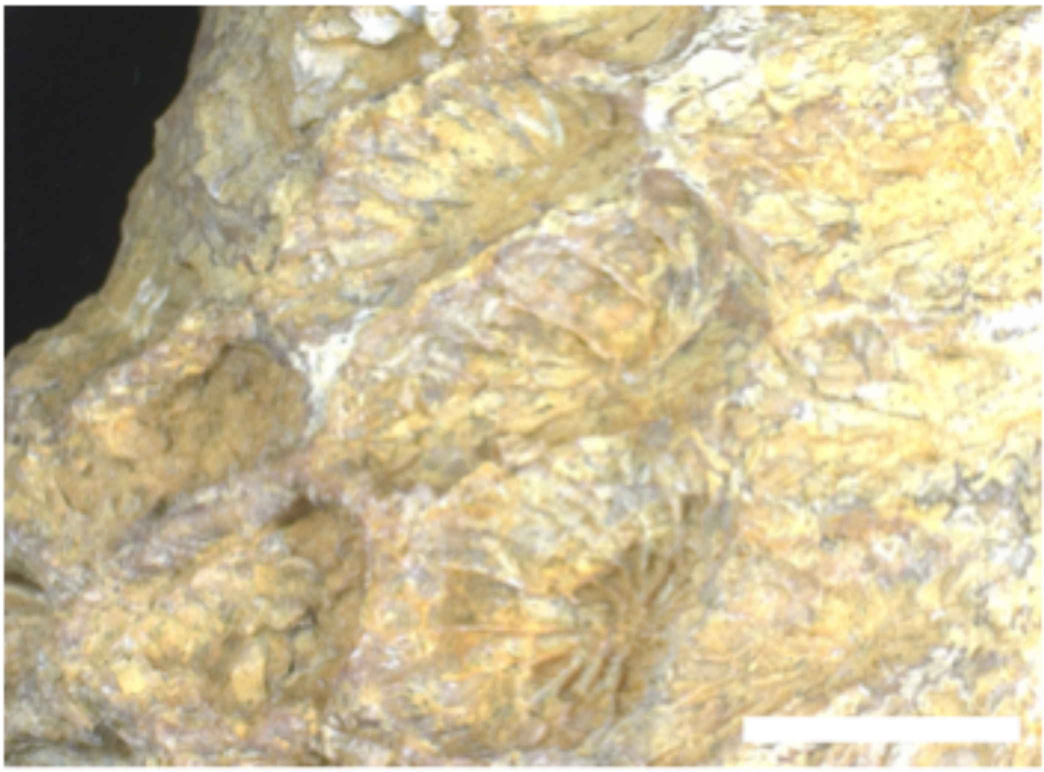


Figure 81: *Favites* aff. *chinensis* – part of oral surface.



Favites cf. *oligocenica* Chevalier, 1955

(Figs. 82 and 83.)

Identification Reference(s):

Schuster, 2002, p. 95, Pl. 5, figs. 5-8; figured specimen is from the Late Oligocene of Doutsiko, Mesohellenic Basin, Greece (specimens no. NHMW 2000z208/0044; NMHW = Natural History Museum of Vienna).

Description: Massive? colony form, but only one small piece found. Colony type: cerioid. Columella spongy. Septa: 37-42 per corallite. Septa: not exsert. Septa often in-line across walls. Septa not straight when viewed in transverse section, they tend to meander. Septal spacing: 1-2 per mm. Two, possibly 3 septal orders (feature poorly preserved): large, (small?) medium, (small?) large, (small?), medium etc. Septal lengths: 1st order reaches calice centre, 2nd orders reaches 1/2 towards centre, 3rd order, where present reach 1/3 towards centre. Possible larger lobes on septa near calice centre, with rounded teeth on the distal margins. Distal septal margins: small, round-ended, conical teeth. Septal faces: small rounded bumps/granules (feature poorly preserved). Calice diameters: approximately 10.0-20.0 mm. Corallite spacing: 9.9-19.2 mm. Corallites have between 4 and 7 sides. Theca made up of a 2-walled structure, feature observed where top of dividing wall is broken. Budding type: unknown. Intracalicular, vesicular dissepiments located between septa. Underside: smooth but uneven, mainly covered by attachment scar. Plate thickness: approximately 8.0-20.0 mm.

Remarks: This specimen fits the description of *F. oligocenica* in Schuster (2002), from the Oligocene of NW Greece. The corallites are roughly the same size, and are angular in both specimens. However, there are slightly more septa (10-12) present in the reference specimen herein (1.5.140), and the first cycle of septa are not noticeably thicker, as described in Schuster (2002). This group may also be closely related to *F. macrocalyx* Schuster, 2002, but it has many less septa. Further study is needed.

Specimens: Seven specimens collected. Reference specimen: 1.5.140 (BMNH no. AZ7554).

Figure 82: *Favites* cf. *oligocenica* – close up of corallites.

Figure 83: *Favites* cf. *oligocenica* – whole specimen.

Fungia (Danafungia)* aff. *horrida Dana, 1846

(Figs. 84 and 85.)

Identification Reference(s):

Hoeksema, 1989, pp. 101-108, figs. 255-280; figured specimens are from the Recent of Fiji, the Philippines, NW Java and Sulawesi, inclusive of the syntype (figs. 255 and 246).

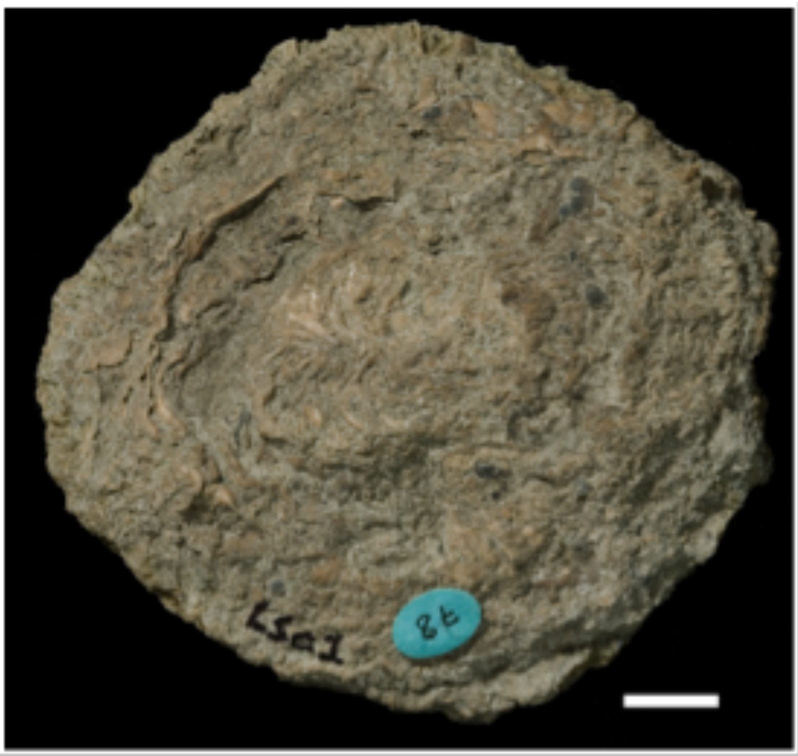
Description: Solitary, discoid colony form. Columella: not visible. Numerous (>100) septa in corallite. Septa are exsert. Septal spacing: 1-3 per mm. Three orders of septa (possibly more but feature poorly preserved). Cannot observe septal pattern (feature poorly preserved). Distal septal margins: uneven with toothy projections - most are broken. Septal faces: granulations (feature poorly preserved). Most visible septa reach the calice centre (feature poorly preserved). Some sections of septa thicken for about 2.5 mm at various points; this may be where large dentations occurred, but have broken-off. Calice diameter: 75 mm. Extramural budding. Underside of corallum: covered with large septo-costae (spaced at 1-2 per mm); extend from outer edge of calice to the centre. At least two concentric ridges present on underside: one approximately 14 mm from outer edge, one approximately 23 mm from outer edge. Corallum thickness: 21.9 mm (at corallum centre).

Remarks: This specimen appears most similar to *Fungia (Danafungia) horrida* in Hoeksema (1989). I have assigned this "aff." status due to the poor overall preservation of the coral specimen. Useful identification features, such as the septal dentation microstructure, are not preserved. This specimen has a much larger calice diameter than given in the description in Hoeksema (1989), and the septa are also more closely spaced. However the specimens in Hoeksema (1989) in fig. 266 show the same concentric ridges on the underside of the corallum. The Fungiidae presently live in shallow-waters near coral reefs and *D. horrida* has previously been identified from the Miocene of Java (Hoeksema, 1989), so this may be an allied species. The main features useful for identification are: the corallum outline is circular (excluding distortion from diagenesis), the septal dentations are large, the septa appear to have varied widely in size and height, the larger septa are more heavily ornamented, and are thicker in structure than the smaller ones, as they may have had much larger dentations. There are quite pronounced costae on the underside, and no fragmentation slits are present (see Hoeksema, 1989).

Specimens: One specimen collected. Reference specimen: LSa1: 78 (BMNH no. AZ8513).

Figure 84: *Fungia (Danafungia)* aff. *horrida* – oral surface.

Figure 85: *Fungia (Danafungia)* aff. *horrida* – underside of corallum.



Fungophyllia monstrosa Gerth, 1923

(Figs. 86 and 87)

Identification Reference(s):

Gerth, 1923. p. 65, pl. II, figs 2-4; specimens figured are from the Miocene of Borneo. Wells, 1956, p. F419-420, fig. 1a and b; figured specimen is also from the Miocene of Borneo (may be the same specimen in both refs.).

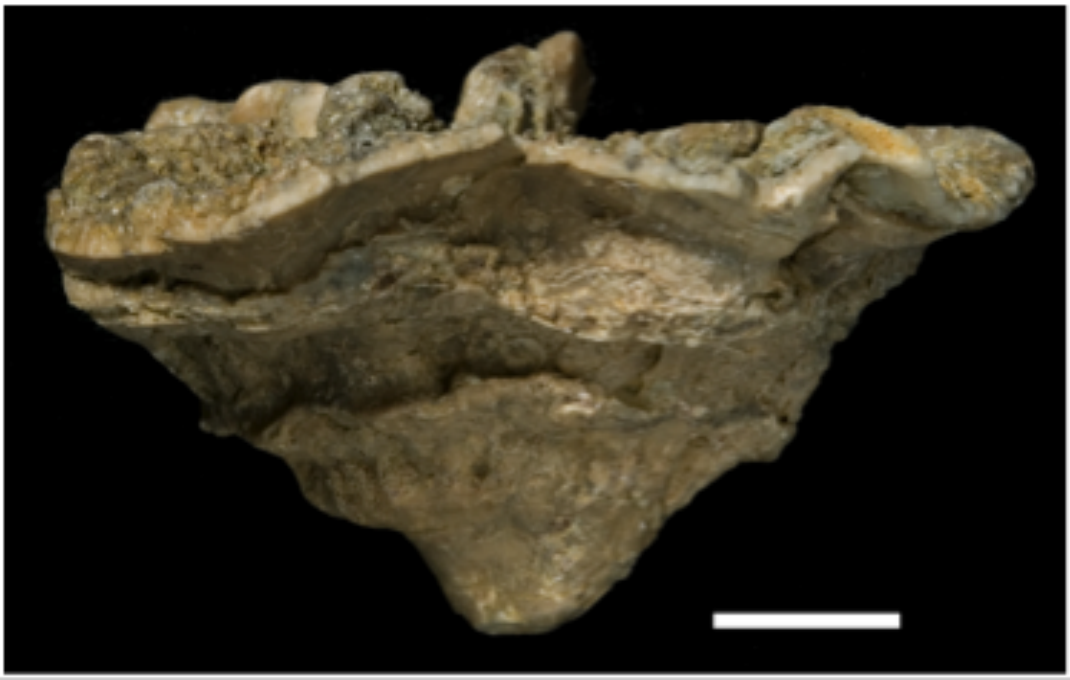
Description: Solitary, patellate, attached colony form. Columella: spongy. Numerous (>50) septa per corallite. Septa: highly exsert. First order septa reach >8 mm above calice surface, and are much wider than other septa (up to approximately 6.4 mm). Septal spacing: 0-2 per mm. Four orders of septa: 6 very large septa, with a mixture of medium, small and very small septa in between; in a clockwise direction there are 5/6 tiny septa straight after the large ones, 1 medium septum, 6 more tiny septa with a small one in the centre (this feature is difficult to observe). Septal lengths: 1st and 2nd septal orders reach columella, 3rd order reaches about 3/4 of the way, 4th order reach just over halfway. Distal septal margins: large teeth of varying sizes along them. Septal faces: small pointed, conical projections (not preserved on all septa). Calice diameter: approximately 67.1 mm; this was calculated as 2 x radius, as most of outer edge of corallum is broken. Underside of corallum: smooth and undulating, feint costae present in one area near base; also shows 3-4 growth ridges, so growth may have occurred in stages. Costal spacing: 1-2 per mm. Plate thickness at outer edge: 1.4 mm.

Remarks: The specimen from this collection is smaller than *F. monstrosa* in Gerth (1923), but it appears to be the same species. I have not read Gerth's description for comparison as it is written in German. The important features used in this identification are: the colony form, the growth form, the septal structure, and the septal pattern.

Specimens: One specimen collected, the reference specimen: LSa: 2017 (BMNH no. AZ8484).

Figure 86: *Fungophyllia monstrosa* – oral surface.

Figure 87: *Fungophyllia monstrosa* – Side view of corallum.



Galaxea aff. *elegantissima* Umbgrove, 1946

(Figs. 88, 89 and 90.)

Identification Reference(s):

Umbgrove, 1946. p. 525, pl. 78, figs. 6-8; figured specimens are from the Lower Pliocene of Central Java (Gunung Linggapadang). Leloux and Renema, 2007. p. 35, pl. 59, figs. 10-15, and pl. 60, figs. 1-6; specimens figured are syntypes from the Miocene-Pliocene of Java, Indonesia (RGM. 525338, 525339, 77509, 77510, 77606, 77605, 167655 and 525340).

Description: Massive colony form. Colony type: plocoid/phaceloid. No columella. Septal spacing: 6-18 per corallite (usually 8). Septa: slightly exsert near outer wall. Septa enlarge slightly at either end when viewed transversely. Septal spacing: 2 per mm. One, possibly 2 septal orders (6 equal septa present, occasionally with 2 of slightly different length - can be larger or smaller). Septal pattern: small?, large, large, large, small? etc. Septal lengths: 1st order reaches 2/5ths towards calice centre, 2nd order reach centre or 1/3 towards centre, both states have been observed. Distal septal margins: smooth (feature poorly preserved). Septal faces: smooth (feature poorly preserved). Calice diameters: 1.3-4.0 mm. Corallite spacing: 2.0-4.4 mm. Corallites: generally circular. Corallites are tubes linked by horizontal dissepiments. Extramural budding. Coenosteum: smooth (feature difficult to observe). Intra- and extra-calicular, tabular dissepiments; intracalicular are between septa and structurally thinner than extracalicular dissepiments. Underside of corallum: identical to upper surface.

Remarks: This specimen could be *G. elegantissima* if some septa have been destroyed during diagenesis, but I cannot see more than 2 septal orders and the columella appears to be absent in the current specimen. I cannot find a more closely related species in the literature.

Specimens: Four specimens collected. Reference specimen: 3.1.671 (BMNH no. AZ7885).

Figure 88: *Galaxea* aff. *elegantissima* – internal corallites.

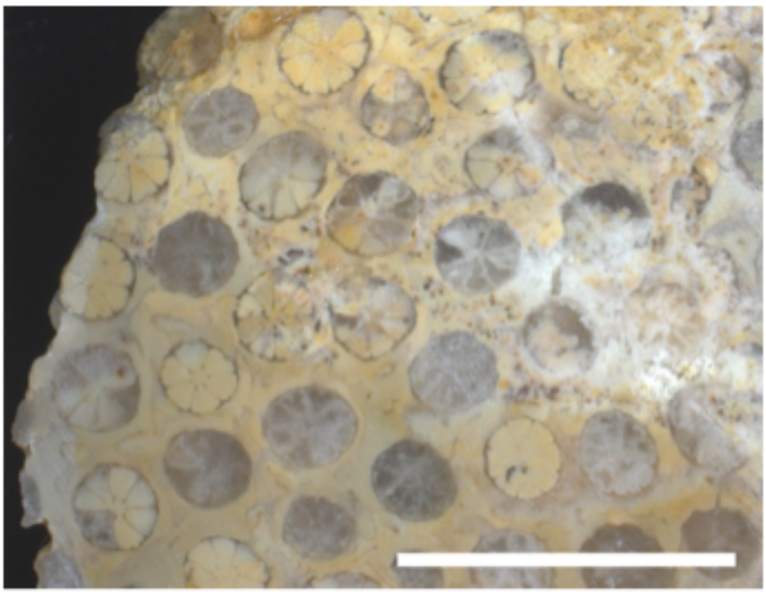


Figure 89: *Galaxea* aff. *elegantissima* – longitudinal section of corallites.

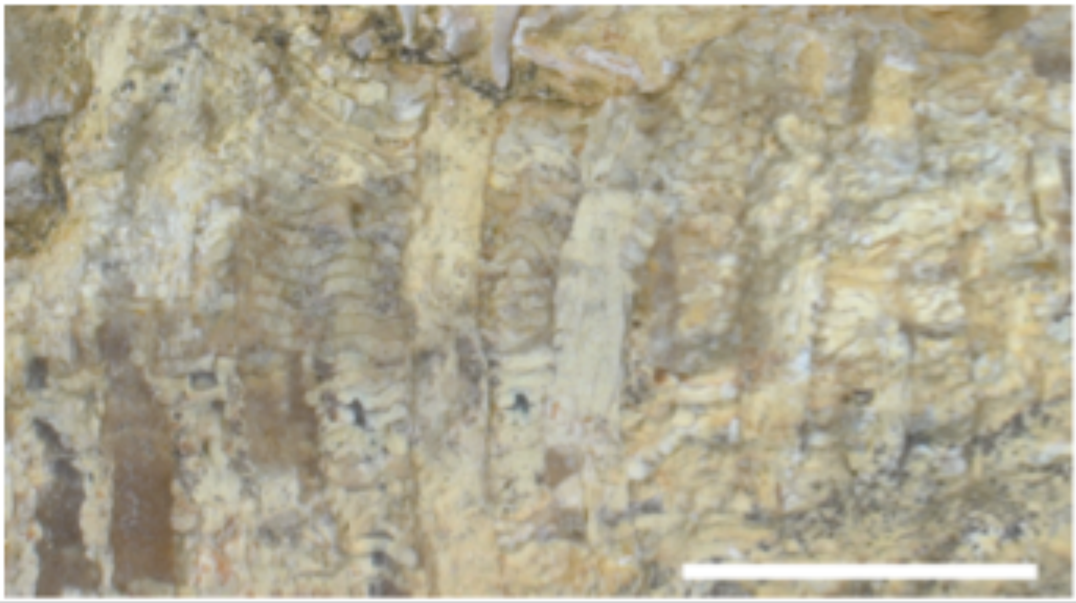
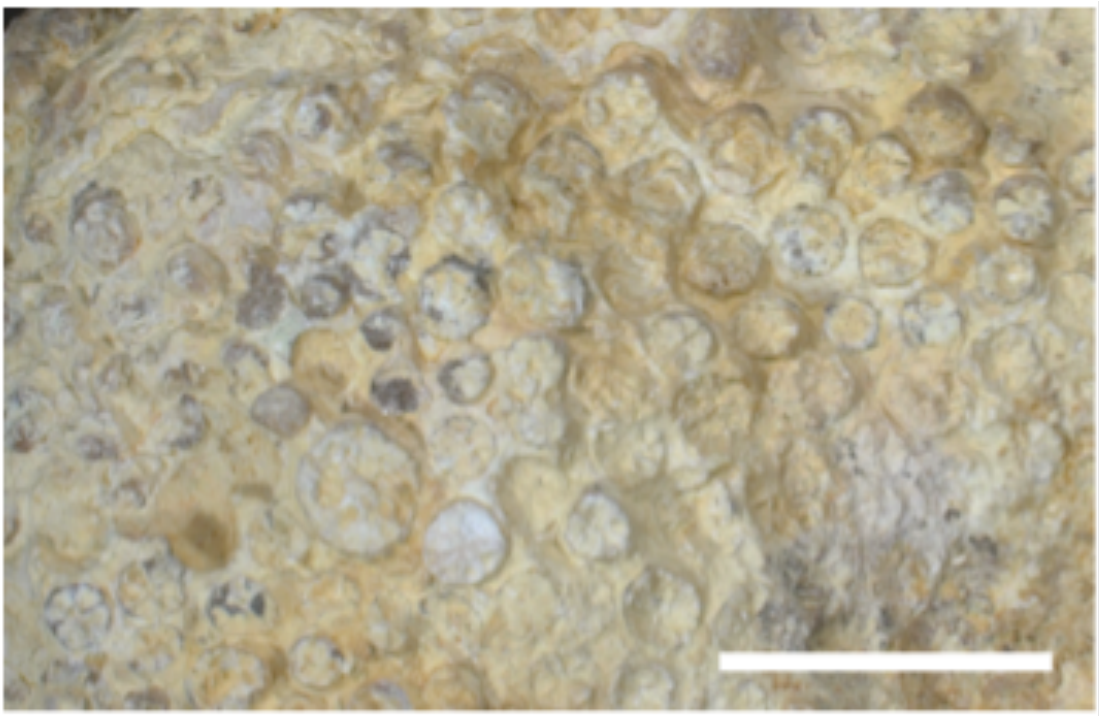


Figure 90: *Galaxea* aff. *elegantissima* – oral surface.



Gardineroseris aff. *planulata* Scheer and Pillai, 1974

(Figs. 91 and 92.)

Identification Reference(s):

Veron and Pichon, 1980, pp. 68-72, figs. 121-125; specimens figured are from the Recent of eastern Australia. Veron, 2000, Vol. 2. pp. 222-223; specimens from Recent of Pemba Island, Tanzania, Seychelles, Great Barrier Reef, Australia, Calamian Islands, Philippines.

Description: Platy colony form. Colony type: cerio-meandroid. Columella: not visible. Approximately 45 or more septa per corallite. Septal spacing: 1-2 per mm. Septa often line-up across calice walls. Most septa bend/curve. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order of septa reaches calice centre, 2nd order reach halfway towards centre. Distal septal margins: uneven, possibly had tiny teeth along them. Septal faces: small rounded bumps/granules. Calice diameters: 8.1-20.7 mm. Corallite spacing: 4.7-12.5 mm. Valley widths: same as corallite spacing values. Valley depths: approximately 4.7 mm. Specimen has discontinuous valleys. Calices/valleys: 1 and 3 centres. Intramural budding. Possible vesicular dissepiments observed; intracalicular (feature poorly preserved). Underside of corallum: uneven, with fans of costae extending in same direction as valleys/ elongation of calices; 1-2 costae per mm. Plate thickness ranges: 3.5-21.3 mm. Walls occasionally bifurcate.

Remarks: This specimen is similar to *Gardineroseris planulata*, but is likely to be a different species because it has much larger calices, and the walls are much less "pavoniid-like".

Specimens: Two specimens collected. Reference specimen: PO: 418 (BMNH no. AZ8568).

Figure 91: *Gardineroseris* aff. *planulata* – close up of corallites.

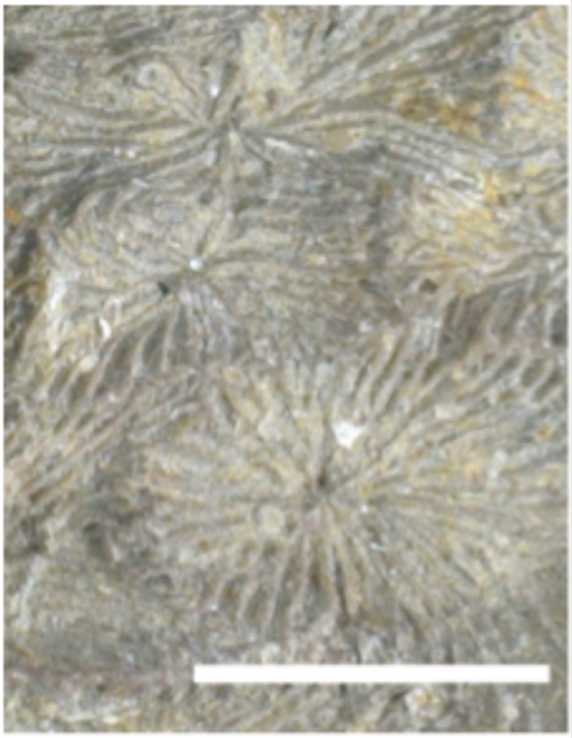
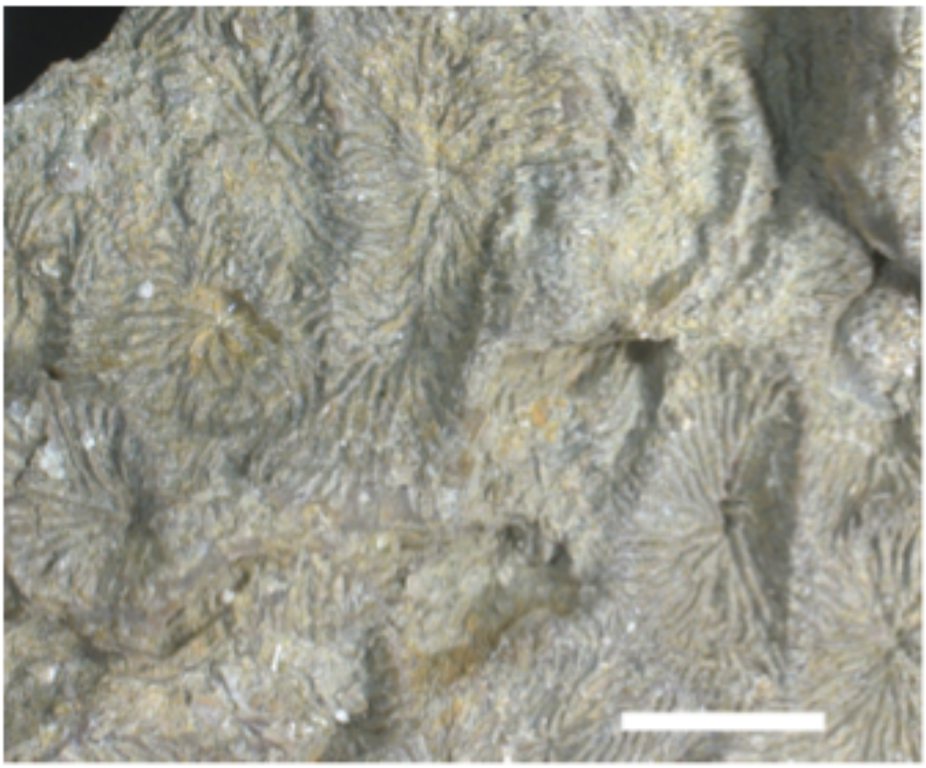


Figure 92: *Gardineroseris* aff. *planulata* – oral surface.



Goniastrea aff. *australensis* (Milne Edwards and Haime, 1857)

(Figs. 93 and 94.)

Identification Reference(s):

Veron, 2000. Vol. 3. pp. 170-171; specimens from the Recent of Geraldton, SW Australia, Solitary Islands, Australia, GBR, Australia, Honshu, Japan, Norfolk Island, Western Pacific and Guam. Milne Edwards and Haime, 1857. pp. 170-171; Veron *et al.*, 1977. pp. 92-95, figs. 176-182; specimens figured are from the Recent of eastern Australia.

Description: Platy colony form. Colony type: meandroid, with visible corallite centres in valleys. Columella: lamellar. Lamellar or trabecular linkages present. Septal spacing: 2-3 per mm. One septal order visible, possibly 2 but the 2nd are almost redundant. Either all same length, or large, small, large, small etc.; this is hard to distinguish due to thickening of the septa during diagenesis. Septa reach valley centres; some turn down valleys at about 90°. Septa get wider towards valley centres in longitudinal view. Distal septal margins: slightly uneven/toothy. Septal faces: slightly lumpy, but mainly smooth; detail appears to have been lost during diagenesis. Corallite spacing: approximately 5 mm. Valley width: 1.5-5.0 mm. Valley depth: approximately 1-2 mm. Valleys are continuous; occasional cerioid calices observed. Some members of species group have sinuous valleys, others have fairly straight valleys. Walls bifurcate. Intramural budding. Dissepiments not seen as there is no internal structure preserved. Underside: uneven and roughly striated; approximately 2-3 per mm. Plate thickness: 5.5-19.7 mm.

Remarks: This coral appears to show a halfway point in evolution from cerioid to meandroid or *vice versa*. This group looks similar to both *Platygyra* and *Leptoria* as seen in the major identification references listed in section 3.2. However the septa always lie directly across walls in *Platygyra* and *Leptoria*, and in the reference specimen the septa tend to alternate across the walls. This group also has a slight structural resemblance to *Symphyllia recta* (Dana, 1846), in Veron and Pichon (1980 p. 284, fig 490) and also to *Goniastrea australensis,* in Veron *et al*. (1977 p.93, fig 176 and 177), however the ref. specimen has a different growth form than those listed for *G. australensis*, and has much narrower valleys. This is thought to be a meandroid *Goniastrea*, and is separated from the other species in this genus by the presence of lamellar/trabecular linkages. Features used in making this identification are: centres are present along valleys, there is a single order of septa, septal structure (detailed above), overall scale, and septa turn down valleys.

There are possibly 3 separate morphologies within this group. One tends to have fairly straight, narrow valleys (as seen in the reference specimen), another has much more sinuous, narrow valleys (see specimen 4.2.935 for example of second morphology), and the third (which is only found in Rubbish Dump Quarry) has wider straight valleys, and more regularly spaced septa. The best example of this latter type is specimen 2.5.547. I have chosen not to separate these three morphological types because I cannot tell if they are different species or whether they are ecotypes of the same species.

The internal structure of the walls matches that of the NHM specimen: 1886.12.9.101, which is the holotype of *Ulophyllia aspera* (synonymized with *Oulophyllia crispa* (Lamarck, 1816) in Veron et al. 1977). I am therefore confident that this specimen belongs to the family Faviidae. I have not seen it pictured in any of the references I have studied, so it may be an undiscovered species.

Specimens: Sixty specimens collected. Reference specimen: LSa1: 2027a (BMNH no. AZ8502).

Figure 93: *Goniastrea* aff. *australensis* – close up of valley and centres.

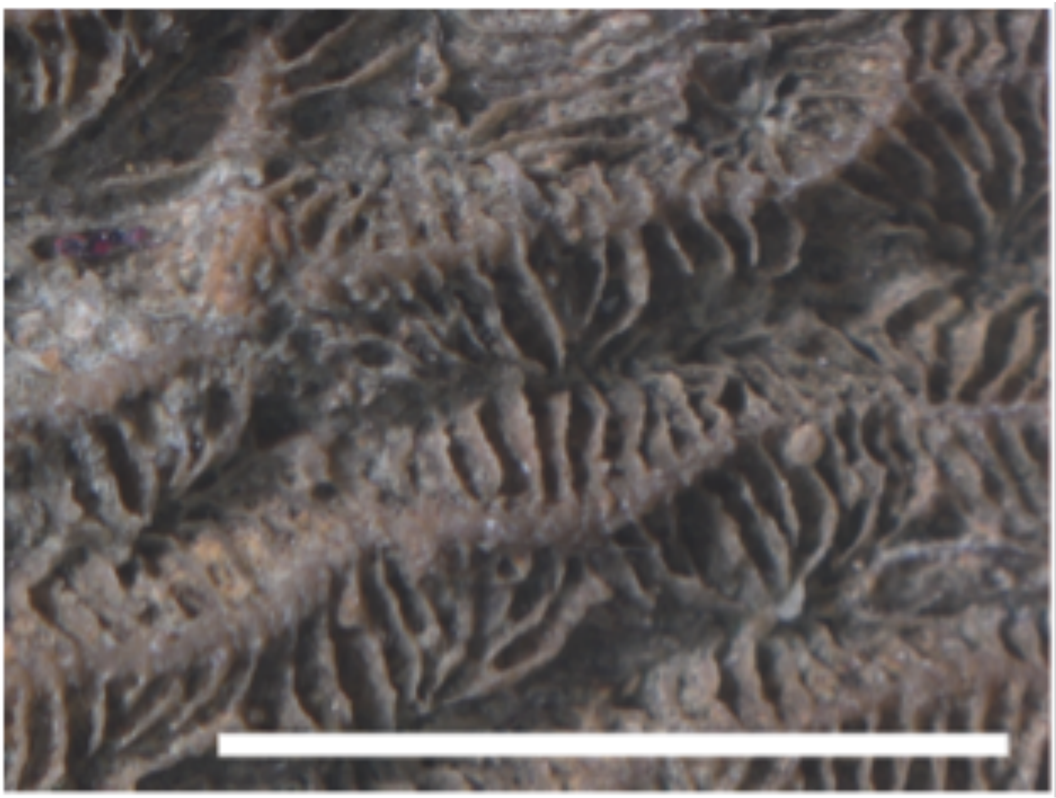
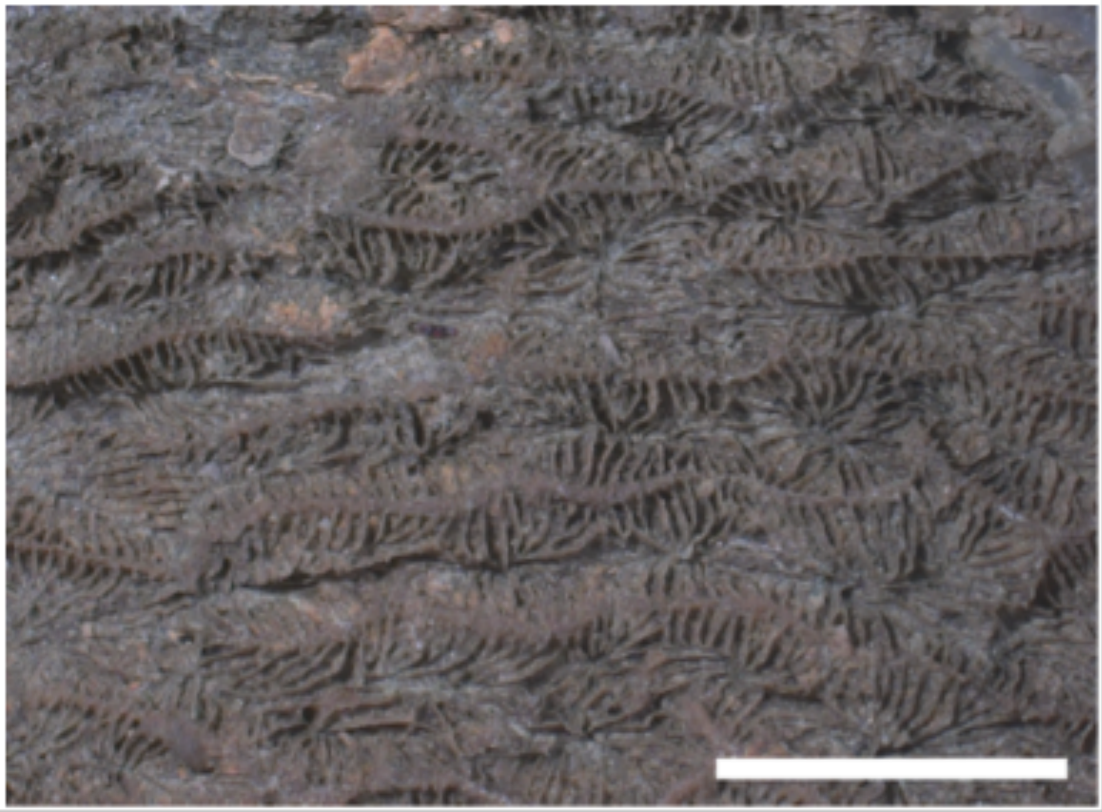


Figure 94: *Goniastrea* aff. *australensis* – oral surface.



Goniopora aff. *djiboutiensis* Vaughan, 1907

(Figs. 95 and 96.)

Identification Reference(s):

Veron and Pichon, 1982. pp. 67-70, figs. 118-124; specimens figured are from the Recent of e. Australia. Veron, 2000. Vol. 3. p. 351; specimens pictured are from the Recent of the Great Barrier Reef, Australia and Pemba Island, Tanzania.

Description: Platy/encrusting colony form. Colony type: cerioid. Columella: spongy. Approximately 24 septa per corallite. Difficult to observe difference between septa and the columella, due to preservation quality. Septa: slightly exsert near outer wall of calice. Septal spacing: approximately 3-4 per mm. Three orders of septa: large, medium, small, medium, large etc. Septa extend ≤0.3 mm from columella. Distal septal margins: bumpy (possibly down to preservation of porous structure); approximately 7 bumps along each margins. Septal faces not observed (sediment infilling calice). Possible pali present (are of similar structure to septa). Calice diameters: approximately 2.5-4.3 mm. Corallite spacing: approximately 2.7-4.5 mm. Extramural budding. Coenosteum: porous. Exothecal (and possibly endothecal?), tabular dissepiments. Underside of corallum: porous. Plate thickness: 2.1-11.2 mm.

Remarks: The reference specimen fits relatively well into the description of *G. djiboutiensis*, but it has a different growth form than the described species in Veron and Pichon (1982). Also the calices of the present specimen do not appear to as deep as in the described species, but this could be down to the poor preservation of the fossils. The main identifying features present are: the number and arrangement of the septa, the porous structure of the corallum, and the size and shape of the corallites.

Specimens: Nineteen specimens collected. Reference specimen: SW1: 284 (BMNH no. AZ8770).

Figure 95: *Goniopora* aff. *djiboutiensis* – close up of corallites.

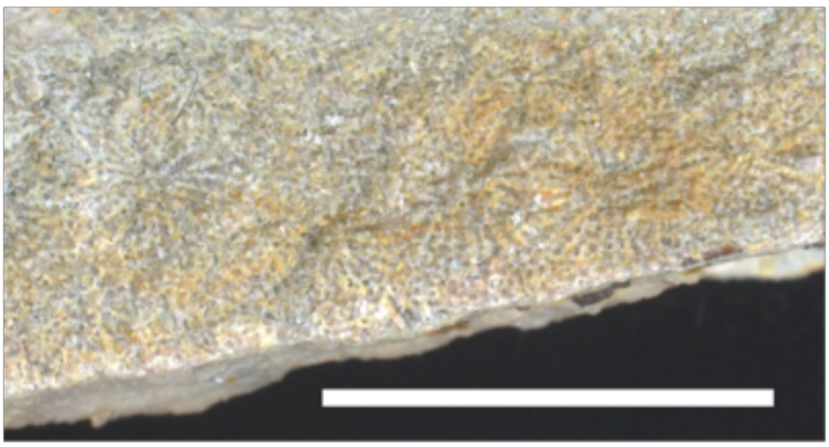
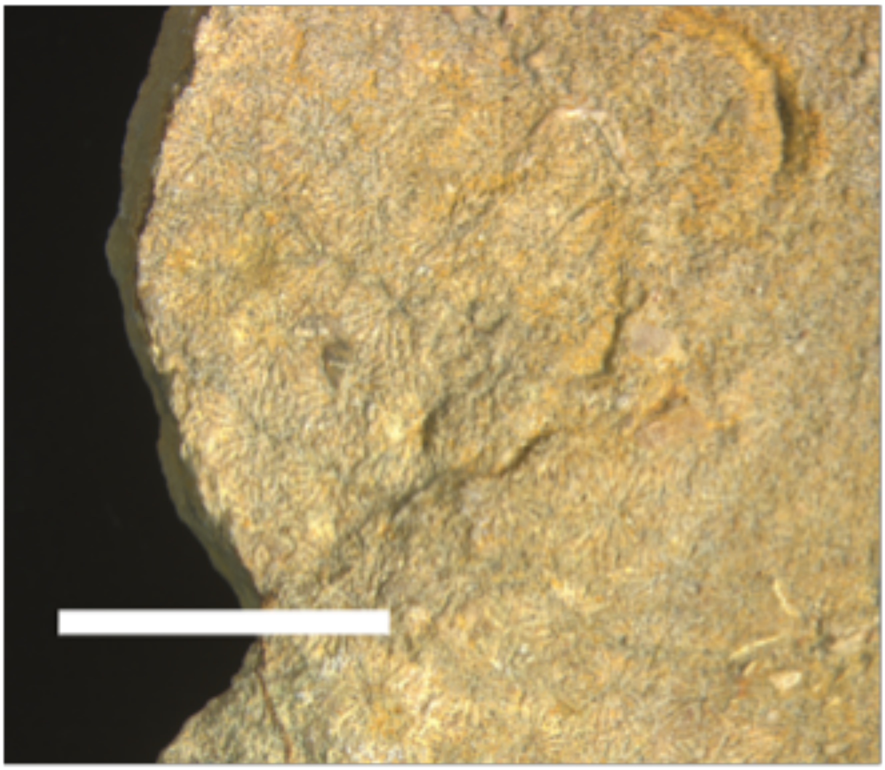


Figure 96: *Goniopora* aff. *djiboutiensis* – oral surface.



Goniopora fruticosa Saville-Kent, 1893

(Figs. 97 and 98.)

Identification Reference(s):

Veron and Pichon, 1982, pp. 101-103, figs. 199-205; specimens figured are from the Recent of eastern Australia.

Description: Branching/ramose colony form. Colony type: cerioid coral. Columella: not visible. Approximately 30 septa per corallite (feature poorly preserved). Septa: not exsert. Septal spacing: 3 per mm. Three orders of septa: large, small, medium, small, large etc. (feature poorly preserved). Septal lengths: 1st order septa reach calice centre, 2nd order reaches ≤2mm towards the centre, possible third order reach ≤1.5 mm. Six largest septa are highly thickened in centre of calice; nearly filling calice altogether.

Distal septal margins: uneven (feature poorly preserved). Septal faces: not preserved well. Calice diameters: 1.9-4.8 mm. Calices: elongated on one side, presumably in direction of growth. Distal corallite edges: very uneven. Corallite spacing: 2.0-5.3 mm. Corallites vary widely in size; all are hexagonal in shape. Extramural budding. Branch diameters: 6.6-11.5 mm. Specimen has a porous corallum structure.

Remarks: This specimen is the same as *Goniopora fruticosa* in Veron and Pichon, (1982, fig. 204). The corallites are slightly larger in this specimen, but the 6 well-developed pali appear to be present, and the specimen in figure 204 of Veron and Pichon (1982) also shows the corallites being extended on one side in the direction of growth as is observed in the current specimen. Due to the porous structure, and poor preservation, it has been hard to discern the septa of this specimen, but in the picture of *G. fruticosa* (in the latter reference) it can be seen that the septa are not well defined even in modern specimens. This specimen is also appears similar to *Dictyaraea micrantha*. Further study is needed.

Specimens: Twenty-two specimens collected. Reference specimen: SW1: 400 c (ii) (BMNH no. AZ8776).

Figure 97: *Goniopora fruticosa* – close up of corallites.

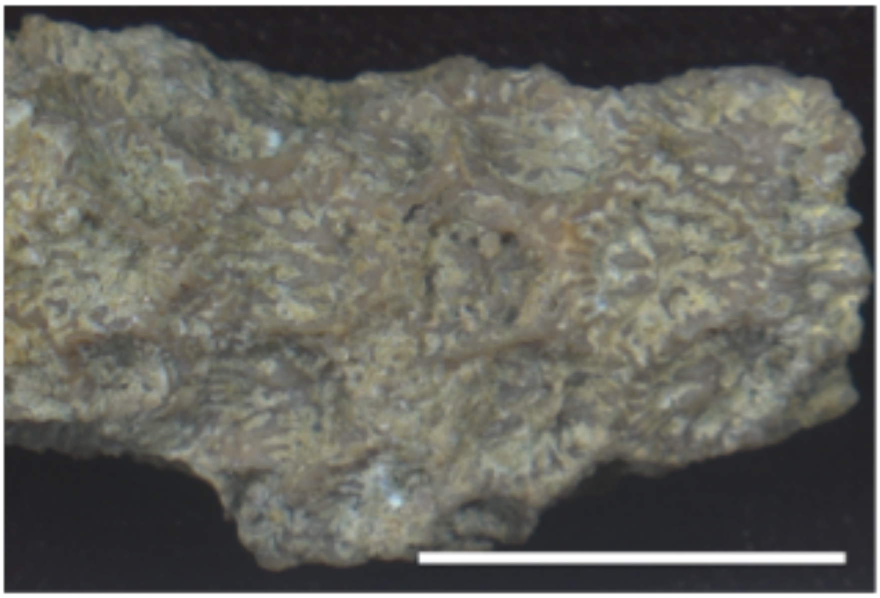


Figure 98: *Goniopora fruticosa* – whole specimen.

Goniopora aff. *stuchburyi* Wells, 1955

(Figs. 99 and 100.)

Identification Reference(s):

Veron and Pichon, 1982, pp. 104-106, figs. 206-212; figured specimens are from the Recent of eastern Australia.

Description: Platy colony form. Colony type: plocoid. Columella: spongy. Hard to see distinction between septa and columella, due to preservational quality. Approximately 24 septa per corallite. Septa are exsert. Septal orders cannot be distinguished due to poor preservation. Septal spacing: approximately 3-4 per mm. All septa reach ≤0.3mm from calice centre. Septal arrangement seems similar to other *Goniopora spp*. but calice is convex from coenosteum rather than concave, although this could be a preservational feature? Distal septal margins: spikey; approximately 5 spikes along each margin. Septal faces cannot be seen as there is sediment infilling calice. Calice diameters: approximately 2.5-2.7 mm. Calices: slightly exsert, rounded mounds. Corallite spacing: approximately 3.6 mm. Extramural budding. Coenosteum: porous. Dissepiments not observed due to poor preservation. Underside: undulating and slightly porous; covered with thin epitheca. Plate thickness: approximately 1.6-3 mm.

Remarks: This specimen is very similar to *Goniopora stuchburyi*, but has it has convex calices; however the scale and septal structures and arrangement are very similar. The main identifying features are: the porous skeletal structure, the number and arrangement of the septa, and the size and spacing of the corallites (see above description for details).

Specimens: One specimen collected. Reference specimen: PO: 431 (BMNH no. AZ8580).

Figure 99: *Goniopora* aff. *stuchburyi* – close up of exsert corallites.

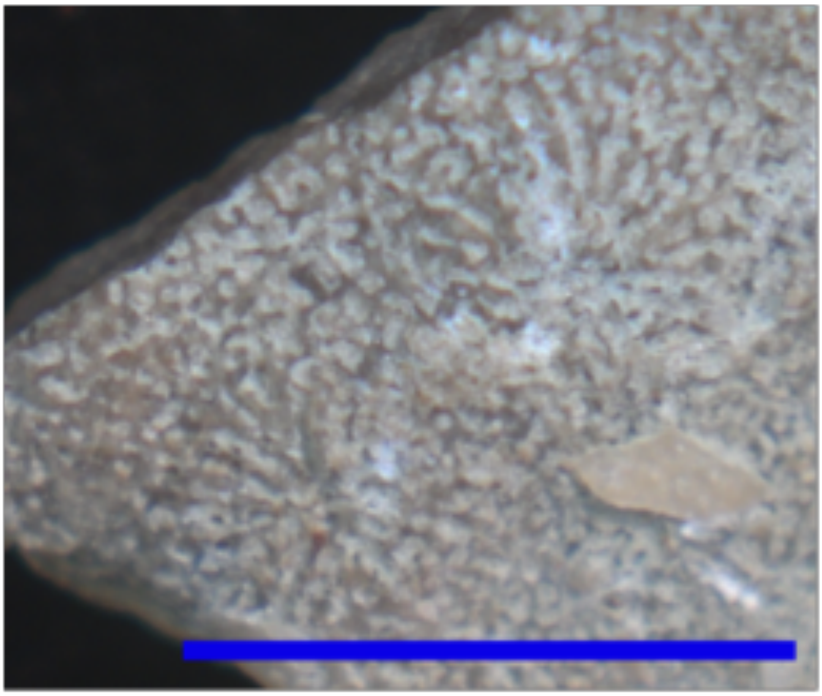
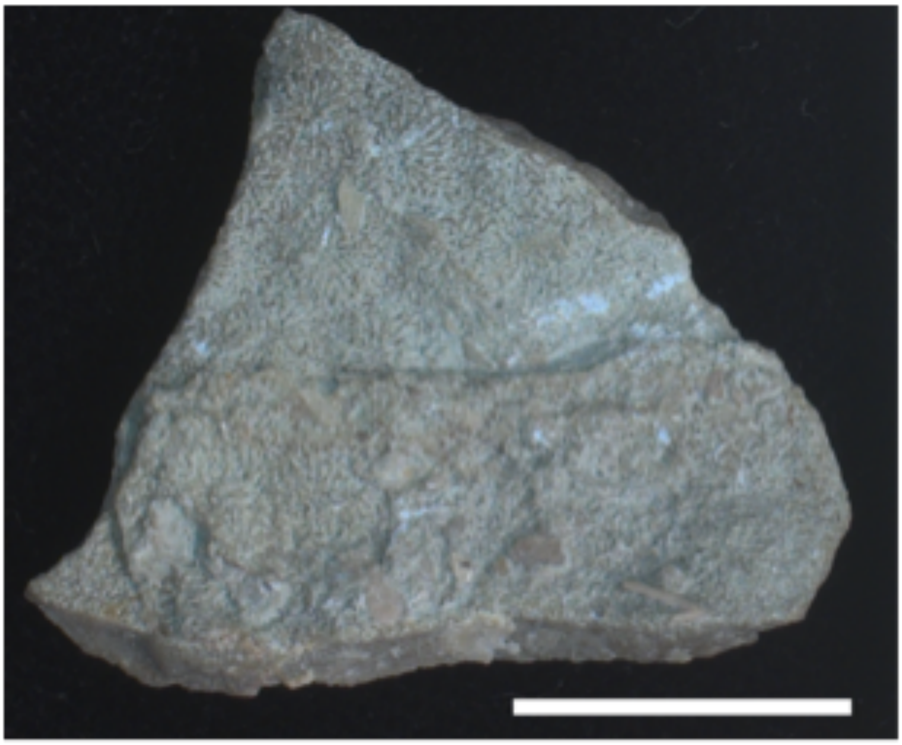


Figure 100: *Goniopora* aff. *stuchburyi* – whole specimen.



Goniopora cf. *stuchburyi* Wells, 1955

(Figs. 101 and 102.)

Identification Reference(s):

Veron and Pichon, 1982, pp.104-106, figs 206-212; specimens figured are from the Recent of eastern Australia.

Description: Encrusting colony form. Colony type: cerioid. Columella: spongy. Approximately 20-24 septa per corallite. Septa: slightly exsert near outer wall of calice. Septal spacing: approximately 4-5 per mm. Three orders of septa: large, medium, small, medium, large etc. Septa reach ≤0.3mm from calice centre. Distal septal margins: slightly bumpy (feature poorly preserved). Septal faces not seen as there is sediment filling the calice. Septa merge with those of adjacent calices to form walls. Calice diameters: approximately 2.0-2.5 mm. Corallite spacing: approximately 1.7-2.7 mm. Extramural budding. Coenosteum: porous. Cannot see dissepiments clearly due to preservation. Underside of corallum: light costae, extending parallel to growing edge; approximately 18 per mm. Plate thickness cannot be measured accurately due to diagenetic alteration.

Remarks: This specimen fits the description of *G. stuchburyi* in Veron and Pichon (1982) and is quite similar to *Goniopora aff. stuchburyi* (in this work), but *G. aff. stuchburyi* has exsert corallites, and has a platy growth form rather than being encrusting like this group and *G. stuchburyi* in Veron and Pichon (1982). This specimen requires comparison to the type of *G. stuchburyi* for confident identification. The main identifying features are: the number and arrangement of the septa, the porous structure of the corallum, and the size and shape of the corallites.

Specimens: Six specimens collected. Reference specimen: SW1: 264 (BMNH no. AZ8754).

Figure 101: *Goniopora* cf. *stuchburyi* – close up of corallites.

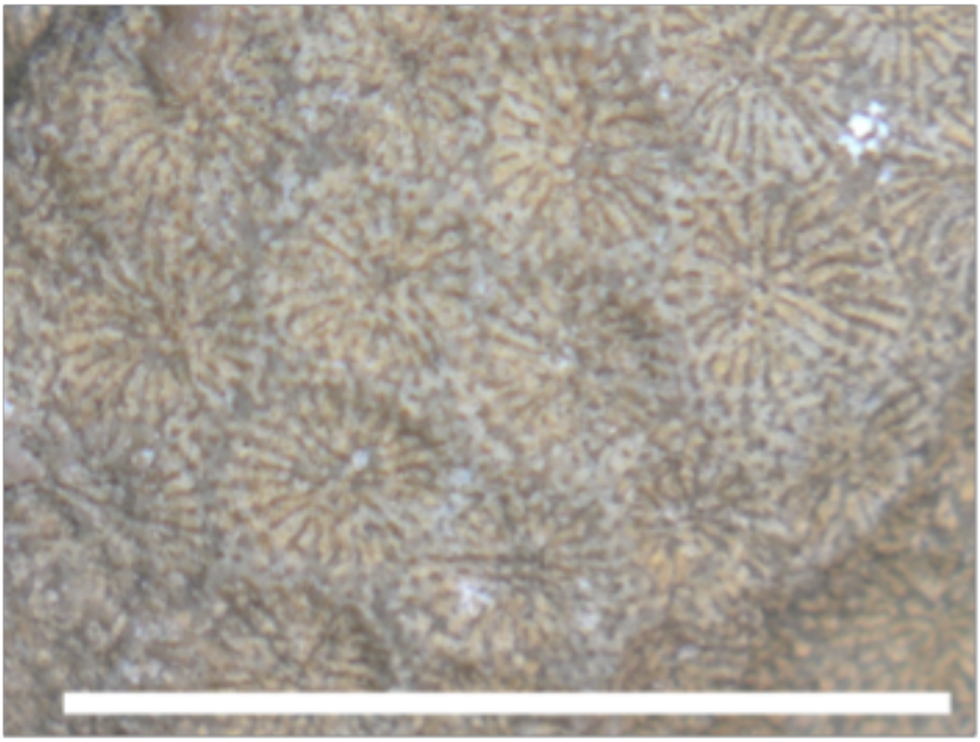


Figure 102: *Goniopora* cf. *stuchburyi* – oral surface.

Hydnophora aff. *exesa* (Pallas, 1766)

(Figs. 103, 104 and 105.)

Identification Reference(s):

Veron *et al.*, 1977. pp. 129-134, figs. 247-254; figured specimens are from the Recent of eastern Australia.

Description: Platy colony form. Colony type: meandroid/hydnophoroid. Columella: not visible. Septal spacing: 3-4 septa per mm. Septa: not exsert. Septa: very regularly spaced. One septal order. All septa reach centres of valleys. Distal septal edges: uneven and bumpy. Septal faces: small pointed bumps/granules. Has monticule structures: discontinuous stretches of wall, surrounded by septa. Septa fuse at top of monticules. Monticules: circular, to elongated and sinuous, with former type being mainly located at growing surface. Valley widths: approximately 2.5-3.7 mm. Valley depths: 0-4.2 mm. Continuous valleys. Extramural budding. Vesicular dissepiments located between septa. Underside of corallum: very lumpy and uneven. Plate thickness: 4.1-50.6 mm.

Remarks: This is a very large specimen, which shows a range of monticule growth variation across the corallum. This specimen has more elongated monticules than are seen in present day *H. exesa*, and it has a different growth form; it is massive, whereas *H. exesa* is stated as being either branching or laminar (Veron *et al.*, 1977).

Specimens: Three specimens collected. Reference specimen: LQ/LSaQ: 2039 (BMNH no. AZ8461).

Figure 103: *Hydnophora* aff. *exesa* – raised elongated monticules.

Figure 104: *Hydnophora* aff. *exesa* – flat monticules.

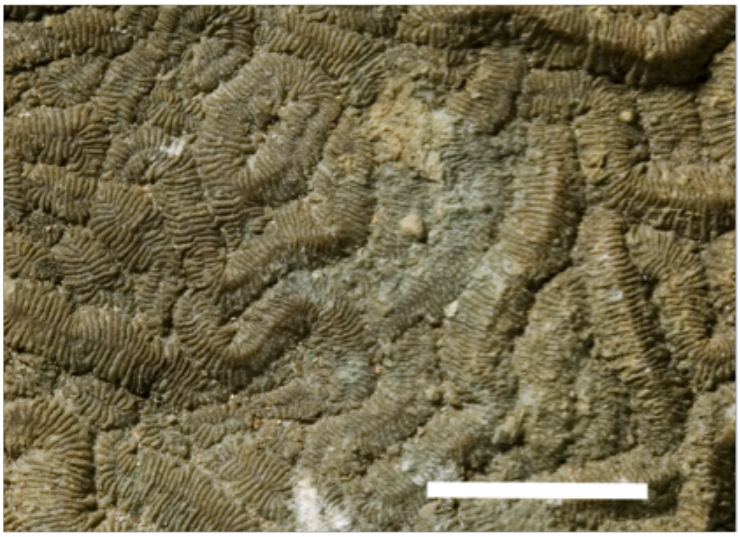
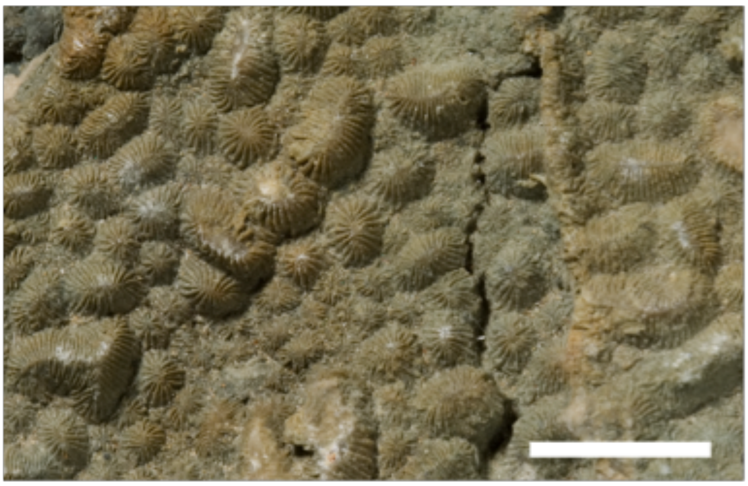


Figure 105: *Hydnophora* aff. *exesa* – round monticules.



Hydnophora aff. *microconos* (Lamarck, 1816)

(Figs. 106 and 107.)

Identification Reference(s):

Veron, 2000. Vol. 2. pp. 372-373; specimens figured are from the Recent of Vietnam, Papua New Guinea, GBR, Australia and the Ryuku Islands, Japan. Veron *et al.*, 1977, pp. 135-137, figs. 255-256; figured specimens are from the Recent of eastern Australia.

Description: Platy colony form. Colony type: plocoid/hydnophoroid. Columella absent or not visible due to sediment in filling. Between 6-28 septa per corallite/ monticule. Septa are not exsert. Septal spacing: 6-7 septa per mm. One septal order. All septa reach centres of valleys. Septa fuse with wall at the top of monticules. Septa widen towards base of monticules. Distal septal margins: slightly uneven. Septal faces: small pointed bumps/granules. Septa appear concave along distal margins, especially nearer the base of each monticule. Monticule diameter: 1.4-5 mm. Monticule spacing: 1.4-4.1 mm. Many monticules are circular, some slightly polygonal. Tops of monticules: rounded. Monticules: cone-shaped. Valley width is same as the monticule spacing. Valley depth/height of monticules: 0.6-1.4 mm. Valleys are continuous. Walls do not bifurcate (as they are monticule structures). Extramural budding. Tabular dissepiments observed between septa. Underside of corallum: flat, but hard to observe as covered with encrusting organisms. Plate thickness: 1.5-4.1 mm.

Remarks: The monticules look similar to those seen in *Hydnophora rigida* (Dana, 1846) (in Veron *et al.*, p. 126, fig. 244), but have the layout observed in *H. microconos*. This specimen has similar monticule morphology to *H. rigida*

(Veron, 1977), but on a much smaller scale. The group has similar structural measurements to *H. microconos*, in fact *H. microconos* fits within this specmens measurement range. However the monticules are far more rounded in the current specimen than in *H. microconos*, and this specimen has a different growth form to *H. microconos*: it is thin and platy rather than branching. For these reasons I have identified it as a possible new species.

Specimens: Two specimens collected. Reference specimen: PP1: 330 (BMNH no. AZ8616).

Figure 106: *Hydnophora* aff. *microconos* – close up of monticules.

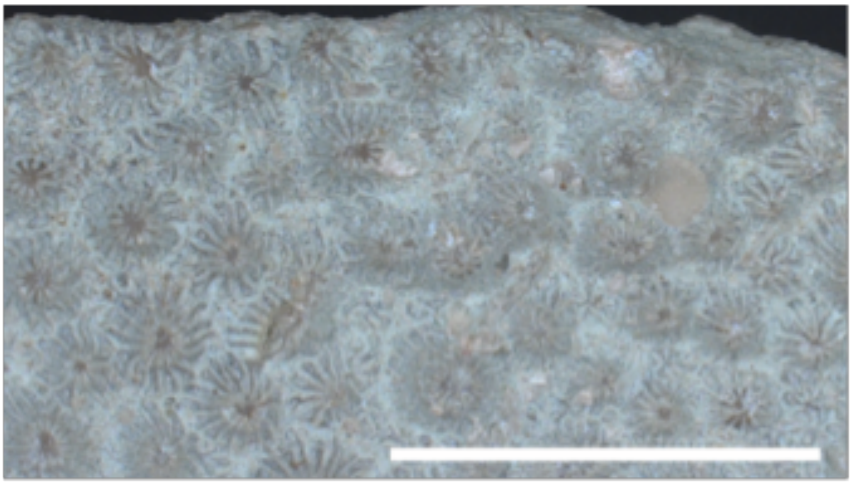
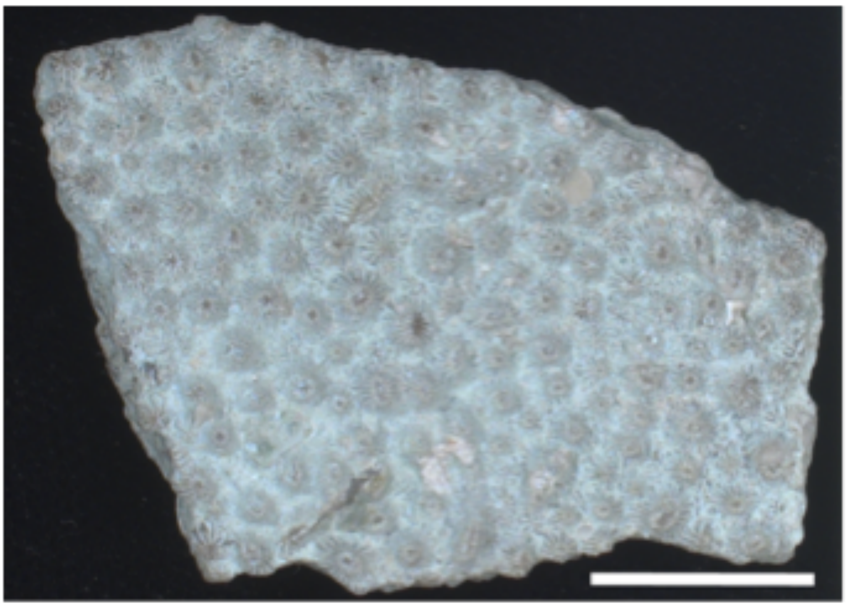


Figure 107: *Hydnophora* aff. *microconos* – whole specimen.



Hydnophora cf. *solidior* Duncan, 1880

(Figs. 108 and 109.)

Identification reference(s):

Schuster, 2002. pp. 23, pl. 7, figs. 2-5; figured specimens are from Late Oligocene of Abadeh, Iran (NMHW 2000z0201/0047, 2000z0201/0048, 2000z0201/0049, 2000z0201/0050).

Monticulastraea solidior: Gerth, 1923. p. 141. Pl. 5, fig. 4; specimen is from the Miocene of Borneo.

Description: Platy colony form. Colony type: meandroid/hydnophoroid. Lamellar columella. Septal spacing: 4-7 septa per mm. Septa: not exsert (reaching identical height to walls). Two septal orders: large (thicker), small (thinner), large, small etc. All septa reach centres of valleys; are lined up rather than alternating across valley walls; are very evenly spaced along walls, but widen towards valley centres. Distal septal margins: slightly uneven, smooth in places (feature may be diagenetically altered). Septal faces: small rounded bumps/ granules. Valley widths: 4-13 mm. Valley depths: approximately 0-5 mm. Continuous valleys. Walls do not bifurcate. Has monticule structures (discontinuous stretches of wall, surrounded by septa); monticules are both raised or flat (larger valley widths for flatter monticules suggests that septa are always similar in length along distal margins). Monticules are conical, polygonal and elongated (after Bosellini, 1999), with the latter being most common. Intramural budding. Underside of corallum: light costae; 5-7 per mm. Plate thickness: 3.2 -13.4 mm.

Remarks: This specimen group is likely to be *H. solidior*, but may possibly be *Hydnophora pulchra* Michelotti, 1871, although the septa are described as spaced further apart for *H. pulchra* in Schuster (2002), so I have chosen to ally this group with *H. solidior*. There does not appear to be a large difference between *H. pulchra* and *H. solidior* in Schuster (2002), many of their measurements overlap, and I believe they may be the same species. Comparisons to type specimens of both fossil species would aid in identification. The type of dissepiments present, and the structure of the distal septal margins are not visible due to diagenesis. This coral may also be closely related to *H. affinis* Sismonda, 1871, as it has very similar skeletal structures. This is one of the most common species of coral collected from the study area.

I have also noticed that in Bosellini's (1999) revision of the Tertiary *Hydnophora* she states that t-shaped ends to the septa are a diagnostic character of this genus, I have observed them in fossils of other genera within the Faviidae, such as in illustrated specimens of *Leptoria* (e.g. Schuster, 2002 - Plate 7, figs. 6-8, p.115; Gerth, 1923, pl. 5, fig. 3), as well in *Oulophyllia sp. 1* in this work, and therefore think that they should not be used as a diagnostic character of the *Hydnophora*.

Specimens: Eighty-six specimens collected. Reference specimen: 4.6.1182 (BMNH no. AZ8225).

Figure 108: *Hydnophora* cf. *solidior* – close up of monticules.

Figure 109: *Hydnophora* cf. *solidior* – whole specimen.

Indophyllia cf. *macassarensis* Best and Hoeksema, 1987

(Figs. 110 and 111.)

Identification Reference(s):

Veron, 2000. Vol. 3. p. 81; specimens pictured in this reference are from the Recent of SE Asia. Best and Hoeksema, 1987, pp. 394-396, figs. 5-7; specimens figured are from the Recent of the Spermonde Archipelago, SW Sulawesi, inclusive of the holotype (RMNH 22189 from Samalona) and the paratypes (RMNH 22190, 22191 and 22192).

Description: Solitary coral. Cannot tell if free-living or attached as the specimen base is crushed. Columella: spongy. Approximately 84 septa. Septal spacing: 1-2 septa per mm. Septa: slightly exsert. Three orders of septa observed: large (approximately 23), small (approximately 46), medium (approximately 23), small, large etc.; possibly a 4th septal order but am unsure of observation. Septal lengths: 1st order reaches calice centre, 2nd order reaches 3/4 to centre, 3rd order reaches approximately 2/3 to centre. Small septa appear to curve inwards and fuse with medium septa. Some medium septa curve inwards and fuse with large septa. Distal septal margins: slightly uneven; cannot tell further detail due to diagensis. Septal faces: some granulation, although cannot tell if this is an accurate character, as preservation is poor. Calice diameter: approximately 29 mm. Septo-costae: extend down outer wall of corallite; 1-2 per mm. Cannot tell height of corallum due to poor preservation; the base is not visible.

Remarks: The specimen figured here is poorly preserved and further comparison to a type specimen would be useful in confirming this identification.

Specimens: One specimen collected, the reference specimen: LSa: 2028 (BMNH no. AZ8490).

Figure 110: *Indophyllia* cf. *macassarensis* – close up of septa.

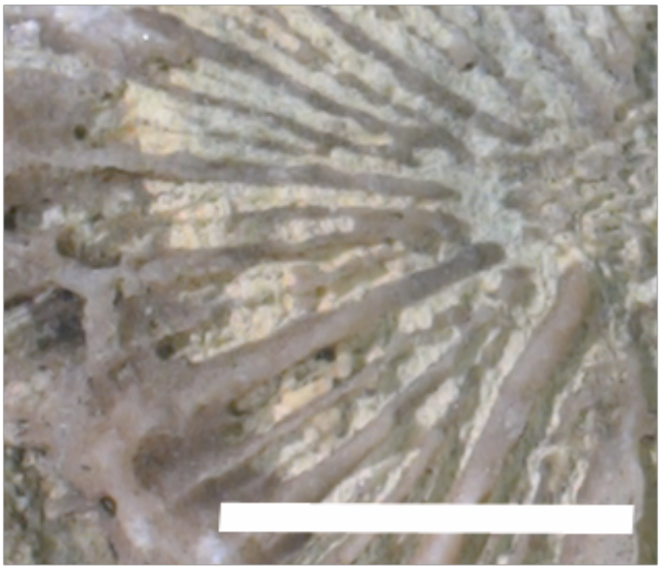


Figure 111: *Indophyllia* cf. *macassarensis* – oral surface.

Leptastrea* cf. *bottae Milne Edwards and Haime, 1849 **/cf. *aequalis*** Veron, 2000

(Figs 112, 113 and 114.)

Identification Reference(s):

Veron, 2000. Vol 3. pp. 234-235 (both species); specimens from the Recent of Sinai Peninsula, Egypt, Cocos (Keeling) Atoll, W. Australia and Madagascar. *L. bottae*: Veron *et al.*, 1977. pp. 155-157, figs. 298-299; figured specimens are from the Recent of eastern Australia, inclusive of the holotype (in figs. 298 and 299).

Description: ?Massive colony form. Colony type: cerioid. Columella: spongy. Septa: 22-23 septa per corallite. Septa: slightly exsert near outer calice wall. Septal spacing: 3-4 per mm. Three septal orders: large, small, medium, small, large etc. Septal lengths: 1st order reaches 2/3 towards centre, 2nd order reaches centre or halfway towards centre, 3rd order reaches 1/3 towards centre. Septal faces: small pointed bumps/granules. Calice diameter: approximately 3 mm; poorly-preserved surface makes accurate measurement difficult. Corallite spacing: 1.7-5.1 mm. Extramural budding. Specimen: very poorly preserved on outer surface, so detail cannot be observed.

Remarks: The poor external preservation means that the specimen could belong to one of the two species mentioned above. It shows similarities to both *Leptastrea bottae* and *L. aequalis*, and the difference between them according to Veron (2000) is that *L. bottae* has a fine groove separating the corallites, while *L. aequalis* is clearly plocoid. However the surface preservation is poor and this distinction cannot be made for this specimen.

Specimens: One specimen found, the reference specimen: SRQ3: 23 (BMNH no. AZ8734).

Figure 112: *Leptastrea* cf, *bottae/aequalis* – internal corallite detail.

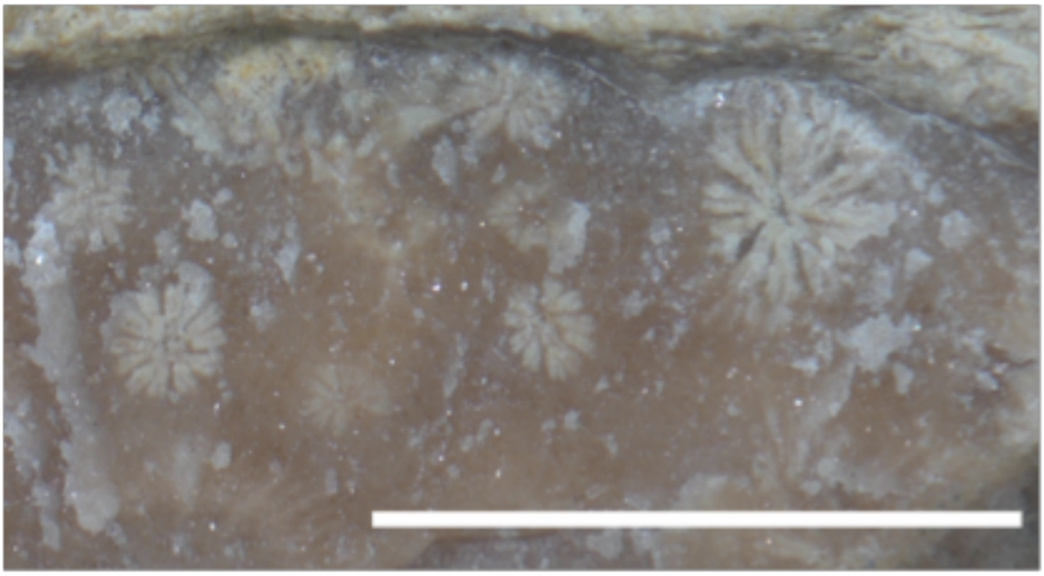


Figure 113: *Leptastrea* cf, *bottae/aequalis* – corallites: longitudinal section.

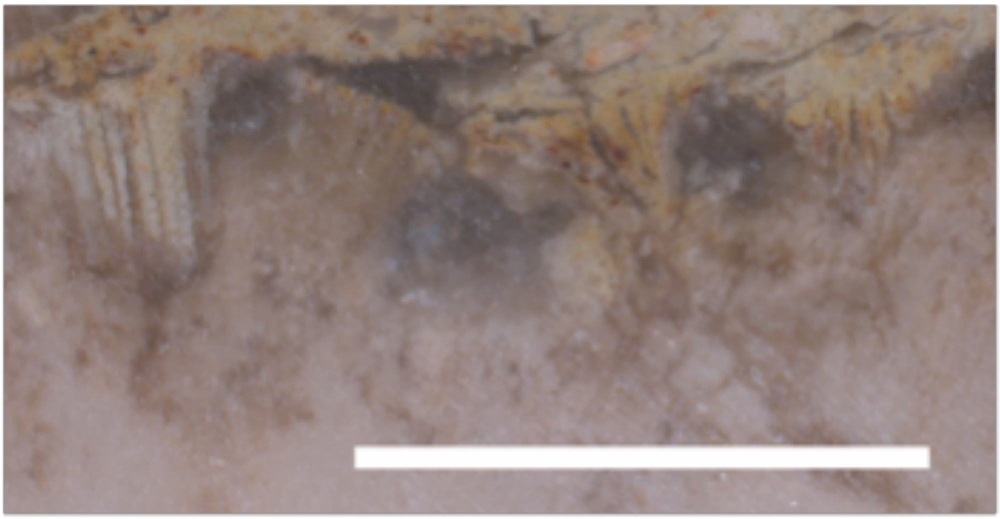
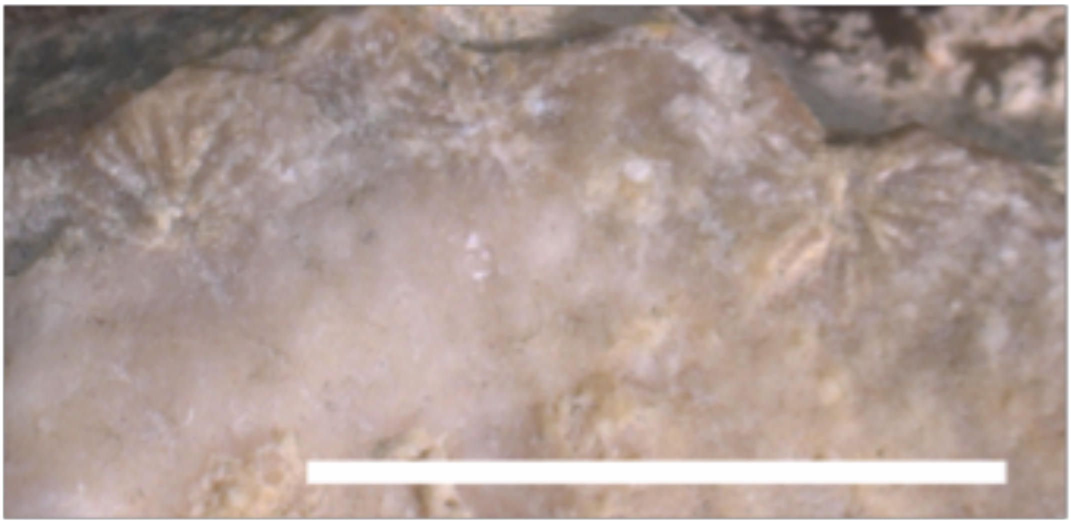


Figure 114: *Leptastrea* cf, *bottae/aequalis* – external corallites.



Leptastrea cf. *transversa* Klunzinger, 1879

(Figs. 115, 116 and 117.)

Identification Reference(s):

Veron, 2000. Vol 3. p. 238; specimens pictured are from the Recent of Sinai Peninsula, Egypt, Calamian Islands, Philippines, GBR, Australia and Papua New Guinea. Veron *et al.*,1977, p. 162-163, figs. 311-318; figured specimens are from the Recent of eastern Australia.

Description: Massive colony form. Colony type: cerioid. Columella: spongy. Numerous (>50) septa per corallite. Septa: slightly exsert. Septal spacing: 4-5 per mm. Four septal orders: large, small, tiny, medium, tiny, small, large etc., although this pattern can vary. Septal lengths: 1st order reaches centre, 2nd order reaches 2/3 towards centre, 3rd order reaches approximately 1/3 towards centre, 4th order reach approximately 1 mm towards centre. Specimen shows thickening of first order septa in most calices. Distal septal margins: smooth/ slightly uneven (feature poorly preserved). Septal faces:

small pointed bumps/granules. Calice diameters: approximately 7.2 mm. Calice walls fuse together to make 1 wall that separates corallites. Corallite spacing: 4.4-8.8 mm. Intramural budding. Vesicular dissepiments observed.

Remarks: This specimen is likely to be *L. transversa*, but the preservation is poor so it is hard to tell for certain. Comparison to a type specimen would be useful in this case.

Specimens: One specimen found, the reference specimen: 3.5.790 (BMNH no. AZ7921).

Figure 115: *Leptastrea* cf. *transversa* – close up of corallites.

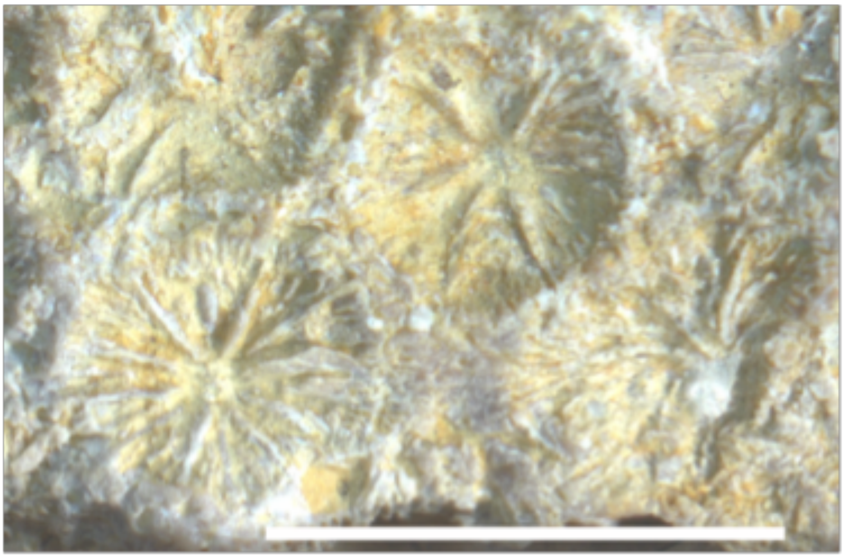
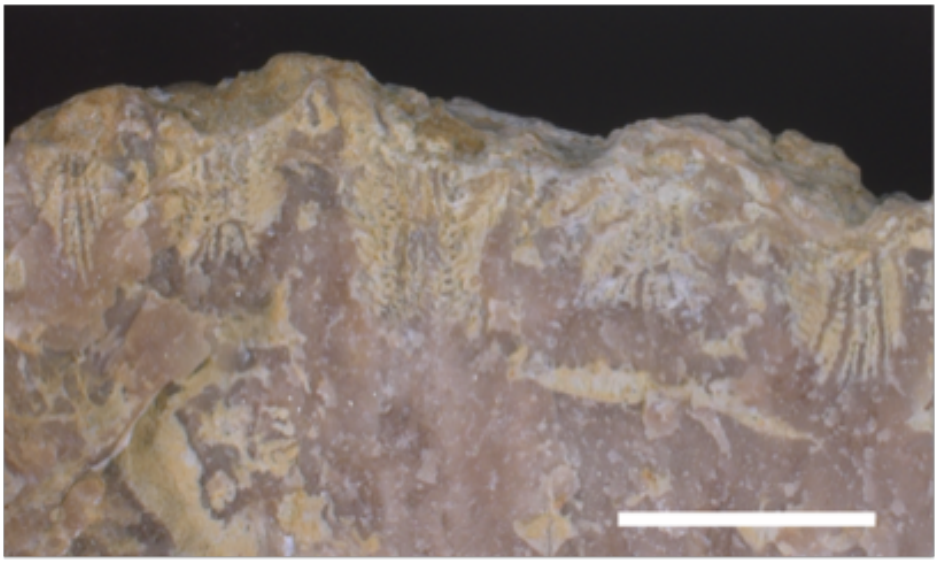


Figure 116: *Leptastrea* cf. *transversa* – oral surface.

Figure 117: *Leptastrea* cf. *transversa* – corallites: longitudinal section.



Leptoseris aff. *glabra* Dinesen, 1980 /*scabra* Vaughan, 1907

(Figs. 118 and 119.)

Identification Reference(s):

Dinesen, 1980. pp. 194-196 and 200-201, Plates: 8-9 (*L. scabra*) and 15-16 (*L. glabra*); specimens illustrated are: in 8-9 are the cotypes (USNM 20886 and BM 1886.12.9.295) as well as other specimens (ZD 9273, ZD 10215 and ZD 9613); in 15-16 are the holotype (BM 1979.4.7.1) and paratypes (ZD 9496 and BM 1979.4.7.5). (USNM = United States National Museum; BM = British Museum (Natural History); ZD = Collection of Z. Dinesen (specimens at James Cook University)).

Description: Platy colony form. Colony type: meandroid. Columella: not visible. Septal spacing: 3-5 septa (or costae) per mm. Septa: exsert. Septa: wider towards valley centres and centre of "walls" ("walls" in this case, being spaces between valley centres). Septa at ends of valleys point towards valley centre. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order septa reach approximately 0.5mm nearer to valley centres than 2nd order septa. Larger septa are at least twice as thick as smaller septa. Distal septal margins: uneven and bumpy. Septal faces: small rounded bumps/granules that are longer in transverse section than longitudinally. Valley widths: 3.7-11 mm. Valley depths: <1 mm. Valleys: not continuous. Walls bifurcate. Extramural budding. Coenosteum: covered with septo-costae; continuous with walls. Dissepiments: tabular, located between septa. Underside: uneven with very fine striations in the same direction as the septo-costae on the upper side. Plate thickness: 1.8-5.2 mm.

Remarks: This specimen group shows affinities to *L. glabra* and *L. scabra* as described in Dinesen (1980). Both of those species and the studied specimen have strongly alternating septo-costae. The well-developed septal teeth of *L. scabra* are not found in the current specimen, but the distal septal margins are uneven, and it is possible that the teeth may have been lost during diagenesis. The two “aff.” species are noted as having an affinity to one another in Dinesen (1980), and it is possible that this species may be an ancestor to both species, or it may be a closely related but separate species. This specimen differs in having very flat, elongated corallite centres (almost valley-like) compared to the shorter, raised (around the edge) centres observed in the two modern species.

Specimens: Eighty-two specimens collected. Reference specimen: 4.3.971 (BMNH no. AZ8077).

Figure 118: *Leptoseris* aff. *glabra/scabra* – close up of valley.

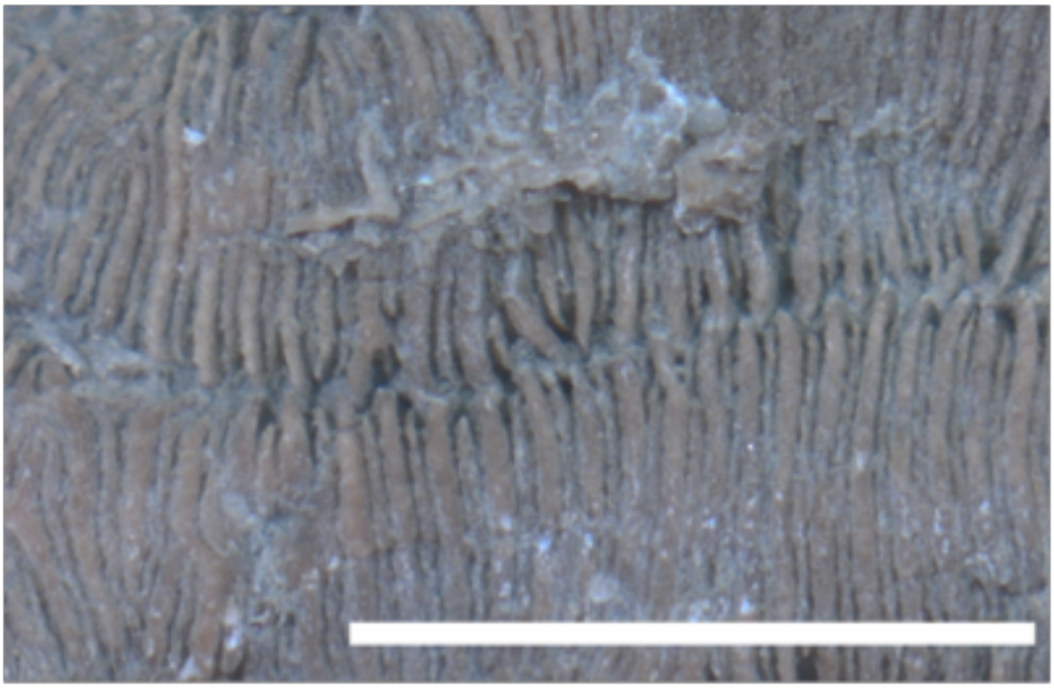
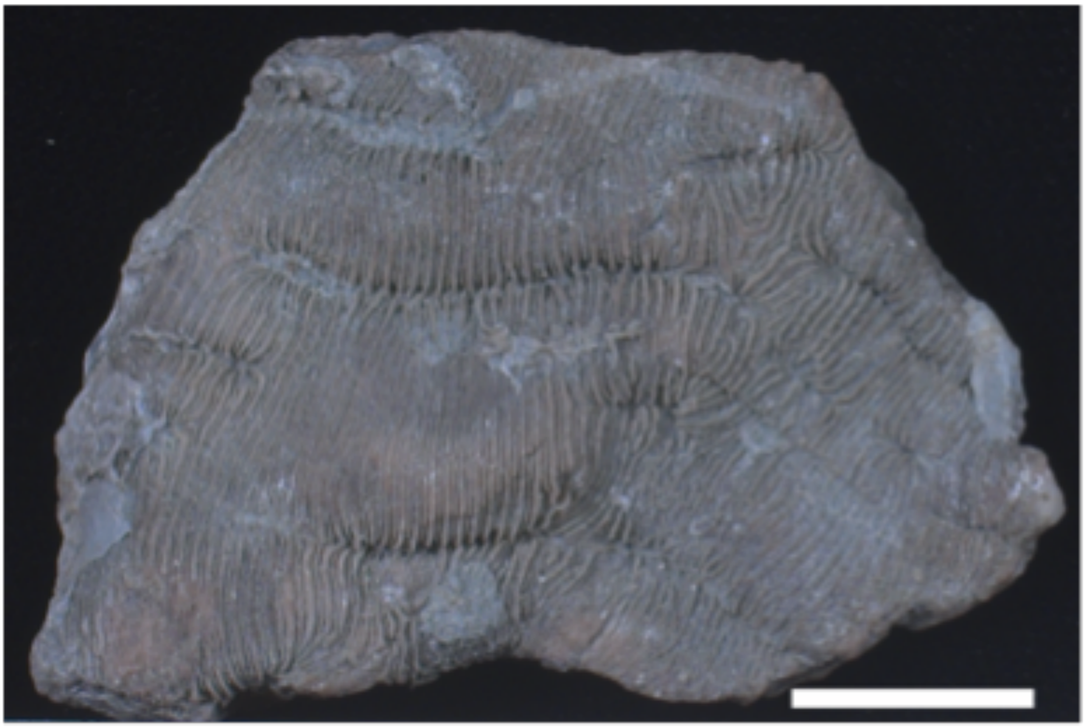


Figure 119: *Leptoseris* aff. *glabra/scabra* – whole specimen.



Lophelia sp. *1* Milne Edwards and Haime, 1849

(Figs. 120-123.)

Identification Reference(s):

Wells, 1956. pp. F427-428, fig. 330, no. 5.; figured specimen from the Recent of the S. Caribbean. Gass and Roberts, 2010; pictured specimens from the Recent in the North Sea. Specimens also compared to BMNH specimen R50910 of *Lophelia ?pertusa* (Linnaeus, 1758) collected from the Recent, from George Bligh Bank, north of Rockall.

Description: Branching colony form. Colony type: plocoid/phaceloid. Columella: spongy. Numerous (>50) septa per corallite. Septa: slightly exsert at outer calice wall. Septal spacing: 2-3 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st order septa reach columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/3 towards columella. Distal septal margins: uneven, possibly with toothy projections – but most are broken. Septal faces: ridges extending parallel to distal septal margins; possible projections present (feature poorly preserved). Calice diameters: approximately 22.2 mm. Calices: exsert. Calical septa become wavy/sinuous towards calice centre, in transverse view. Corallite spacing: approximately 20.9 mm. Corallites: distance from calice edge to columella is greater in one direction (presumed direction of growth) than the other. Underside of corallites: smooth, some feint septo-costae present; 2-3 per mm. Extramural budding. Coenosteum: smooth. No dissepiments. Branch diameters: 5-7.6 mm. Branches always bifurcate at back of corallites. Central corallite seen extending down centres of all branches linking calices. Septal number of central corallite: approximately 25-30 (feature poorly preserved).

Septal pattern of central corallite: same as for open calices. Species observed in growth position: growing flat across surface of platy corals, rather than upward growth.

Remarks: This specimen shows most similarity to the BMNH specimen: R50910. This is a recent specimen of *Lophelia* sp. (no species name given, but presumably *L. pertusa*). The specimen here shows the same internal corallite down the branches as the modern *Lophelia* sp., and the septa become wavy towards the corallite centre in the modern species, as with this specimen. The septal arrangement is basically the same, as are the projections seen on the septal faces in the modern specimen. The coenosteum is smooth for both the recent and modern specimens. This specimen has larger, more open corallites, and a thinner structure overall, suggesting it may have been adapted to shallow-water conditions when compared to *Lophelia pertusa* of the present day. This may be a new species, as nothing similar could be found in the literature. Identifying features are: the branching morphology, the central corallite down the branches, the same septal arrangement and structure in both open calices and central corallite, structure of the columella and the smooth coenosteum.

Specimens: Thirty specimens collected. Reference specimen: 5.-.1446 and 5.-.1450 (BMNH nos. AZ8447 and AZ8451).

Figure 120: *Lophelia* sp. *1* – corallite oral surface.

Figure 121: *Lophelia* sp. *1* – back of corallite.

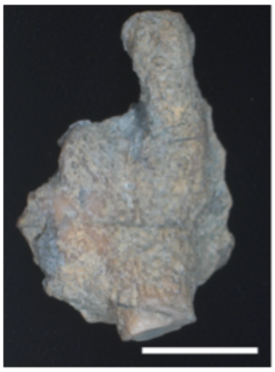


Figure 122: *Lophelia* sp. *1* – corallite oral surface.

Figure 123: *Lophelia* sp. *1* – back of corallite.

Lophelia sp. *2* Milne Edwards and Haime, 1849

(Figs. 124-127.)

Identification Reference(s):

Wells, 1956. pp. F427-428, fig. 330, no. 5.; figured specimen from the Recent of the S. Caribbean. Gass and Roberts, 2010; pictured specimens from the Recent in the North Sea. Specimens also compared to BMNH specimen R50910 of *Lophelia pertusa* collected from the Recent, from George Bligh Bank, north of Rockall.

Description: Branching colony form. Colony type: plocoid/phaceloid. Columella: spongy. Numerous (>50) septa per corallite; smaller septa: not always preserved. Septa: slightly exsert at outer calice wall. Septa: not completely straight. Septal spacing: 2-3 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st septal order reaches columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/3 towards columella. Distal septal margins: uneven, possibly with toothy projections - most are broken. Septal faces: large spines projecting outwards (feature only preserved in certain places). Calice diameters: approximately 10.5 mm. Calices: exsert. Corallite spacing: approximately 11.9 mm. Corallites sometimes funnel-shaped, some are extended on one side, in direction of growth. Underside of corallites: smooth. Branch diameters: 2.3-4.9 mm. Extramural budding. Coenosteum: smooth. No dissepiments. Central corallite observed extending down centres of branches, linking calices to one another. Central corallite has same septal pattern as open corallites. Branches either bifurcate or carry-on as single branches behind corallites.

Remarks: This specimen was found as a ball of broken pieces, suggesting a bushy, branching growth form in life. The specimen shows similarities to BMNH specimen: R50910, a recent museum specimen of *Lophelia* sp. (no species name given but presumed to be *L. pertusa*), and also to *Lophelia* sp. *1* in this work. The specimen here shows the same internal corallite down the branches as modern *Lophelia* sp. The septal arrangement is basically the same, as are the projections seen on the septal faces in the modern specimen. The coenosteum is smooth for both the recent and modern specimens. This specimen has a much finer branching structure than modern *Lophelia* sp. (as with *Lophelia* sp. *1*), suggesting that it was adapted to much shallower waters. The corallites are of fairly similar size, but are more open, and the specimen has thinner walls compared to the modern-day *Lophelia*. This may be a new species, as it does not appear anywhere in the literature studied. Identifying features are: the branching morphology, the central corallite down the branches, it has the same septal arrangement and structure in both open calices and central corallite, the columella type, and the smooth coenosteum, the corallites are approximately half the diameter of *L.* sp. *1* in this work.
Specimens: Thirteen specimens collected. Reference specimen: LSa1: 402 (BMNH no. AZ8512).

Figure 124: *Lophelia* sp. *2* – corallite oral surface: complete edge.

Figure 125: *Lophelia* sp. *2* – corallite oral surface: bifurcating branches.

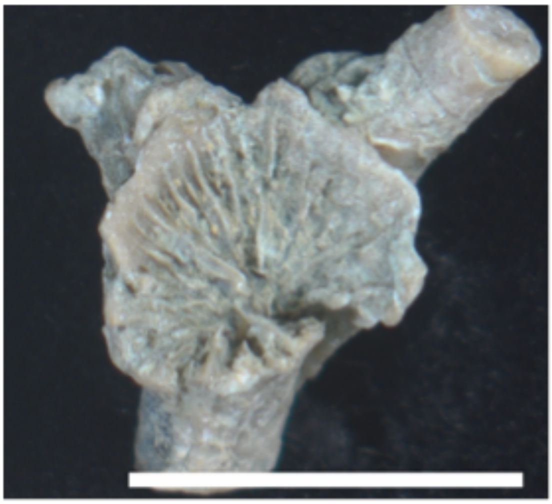


Figure 126: *Lophelia* sp. *2* – central branch corallite.

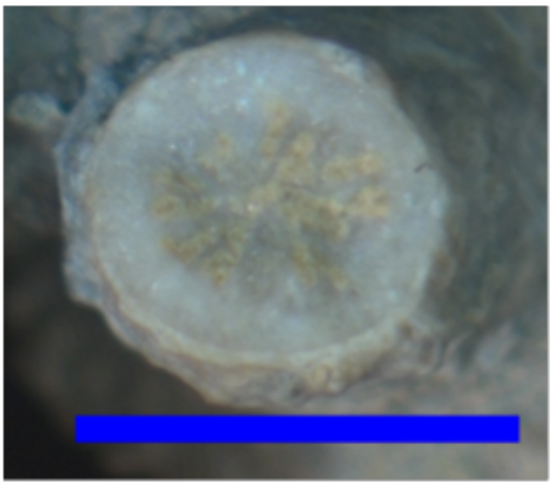


Figure 127: *Lophelia* sp. *2* – corallite oral surface: single branch.

Merulina* aff. *ampliata Ellis and Solander, 1786

(Figs. 128, 129 and 130.)

Identification Reference(s):

Veron and Pichon, 1980, pp. 216-223, fig. 368; figured specimen is from the Recent of eastern Australia (Bowden Reef).

Description: Foliaceous colony form. Colony type: meandroid; has been presumed meandroid, but only one small piece found. Columella: spongy (feature poorly preserved). Numerous (>50) septa per corallite. Septa: exsert, especially in valley centre. Septa: higher at calice edge and centre. Septa positioned around corallite centre in a similar pattern to barbs on a feather. Septal spacing: 1-2 per mm. Two orders of septa: large, small, large, small etc. Most septa reach the calice centre, although sediment infilling makes observation difficult. Distal septal margins: uneven and bumpy. Septal faces:

slightly lumpy, but are difficult to observe due to sediment infilling between septa and poor structural preservation. Corallite diameter: approximately 23.5 mm; this value was calculated from 2x radius, as specimen is only a fraction of entire coral. Actual dimensions of coral specimen: approximately 13.4 mm wide, by approximately 30.8 mm long. Valley widths: 11.9-14.0 mm. Valley depth: ≤3.6 mm. Costae radiate outwards from central attachment scar on one side, but not on other side; 1-2 costae per mm. Septo-costae: oriented in diagonal direction compared to valley centre. Septo-costae on underside extend in same direction (same direction as septa on outer edge of the calice). Plate/Corallite thickness: 0.1-3.4 mm.

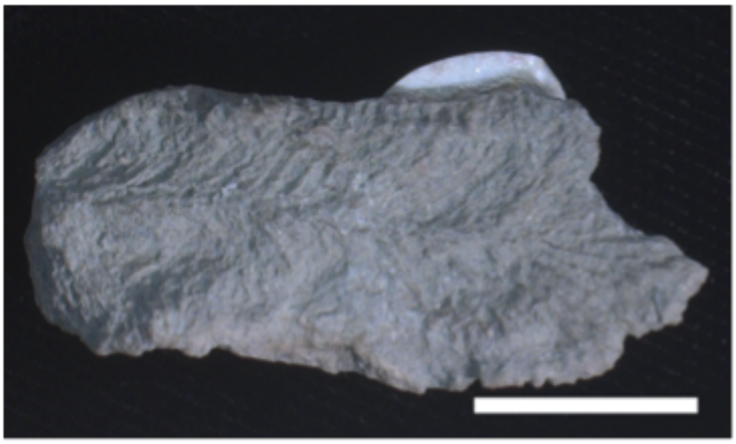
Remarks: I have placed this specimen in the genus *Merulina* as it is thin and foliaceous, and possibly has a trabecular columella that appears fused into a continuous mass, although the preservation is poor. It is similar to *Merulina ampliata* in Veron and Pichon, (1980), however the present specimen is about twice as large in its dimensions. I am uncertain of this species attribution due to such small pieces being found.

Specimens: Three specimens found. Reference specimen: 4.3.946 (BMNH no. AZ8059).

Figure 128: *Merulina* aff. *ampliata* – corallite oral surface.

Figure 129: *Merulina* aff. *ampliata* – back of corallite.

Figure 130: *Merulina* aff. *ampliata* – whole specimen.



?Montastraea colemani Veron, 2000

(Figs. 131 and 132.)

Identification Reference(s):

Veron, 2000, Vol. 3, p. 219; specimens photographed are from the Recent of Cebu and Calamian Islands, Philippines, Vietnam and Guam.

Description: Platy/Massive colony form. Colony type: phaceloid/plocoid. Columella: either spongy or non-existent (feature poorly preserved).

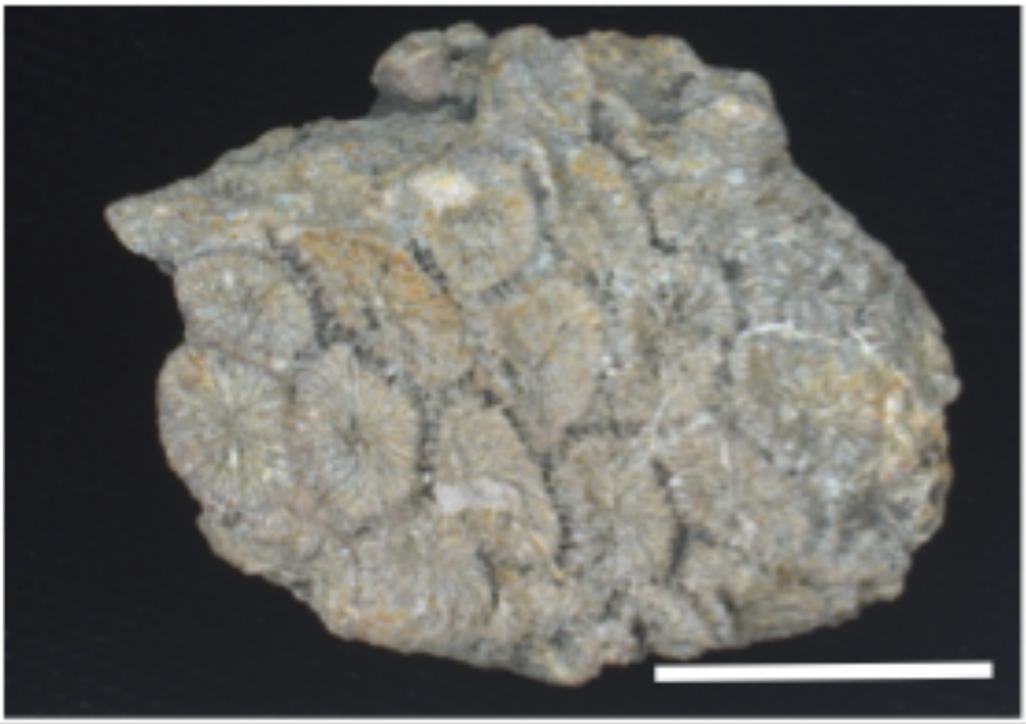
Numerous (>50) septa per corallite. Septa: slightly exsert. Septal spacing: 4-5 per mm. Four septal orders: large, tiny, small, tiny, medium, tiny, small, tiny, large etc. Septal lengths: 1st order reaches centre, 2nd order reaches 1/3-2/3 towards centre, 3rd order reaches approximately 0.6 mm towards centre, 4th order very reduced. Distal septal margins: uneven, possibly with toothy projections – however most are broken. Septal faces: slightly lumpy, but mainly smooth (detail probably lost to diagenesis). Calice diameters: approximately 6.9 mm. Calices centred at top of turbinate-shaped cups, joined together approximately 3mm down. Calices appear "rough", due to fine detail of septal margins being broken; is difficult to distinguish septa because of this. Corallite spacing: 3.5-6.0 mm. Coenosteum: smooth (feature poorly preserved). Underside of corallum: striated with costae; 3-4 per mm. Septo-costae: present; 4-5 per mm. Plate thickness: 7.5-14.0 mm.

Remarks: This specimen has a similar overall appearance to *Montastraea colemani*, and fits the scale given in the description (in Veron, 2000), but as the budding-type was not discernable, it is possible that this specimen may belong to a different coral genus.

Specimens: One specimen found, the reference specimen: SW1: 2023 (BMNH no. AZ8738).

Figure 131: ?*Montastraea colemani* – close up of corallites.

Figure 132: ?*Montastraea colemani* – whole specimen.



Montastraea aff. *curta* (Dana, 1846)

(Figs. 133, 134 and 135.)

Identification Reference(s):

Veron *et al.*, 1977. pp. 137-139, figs. 257-263; figured specimens are from the Recent of eastern Australia. Veron, 2000. Vol. 3. pp. 216-217; specimens pictured are from the Recent of Guam, Calamian Islands, Philippines, Osprey Reef, Coral Sea, Norfolk Island, Western Pacific, Papua New Guinea, GBR, Australia and Scott Reef, W. Australia.

Description: Massive colony form. Colony type: plocoid. Columella is spongy. Approximately 25-30 septa per corallite. Septa: slightly exsert at outer wall of calice. Septa are thin and delicate, as is the theca. Septal spacing: 1-2 per mm. Two septal orders: large, small, large, small etc. Septal lengths: 1st order septa reach columella, 2nd order reaches 1/3-1/2 way towards columella. Distal septal margins: slightly uneven/toothy. Septal faces not preserved well, as there is sediment infilling the calice. Calice diameters: 5.8-9.8 mm. Calices: only slightly exsert and quite shallow. Corallite spacing: 6.0-12.4 mm. Corallites: mostly circular in shape. Extramural budding. Coenosteum not visible. Extracalicular, vesicular dissepiments. Septo-costae extend between corallites. Septo-costal spacing: 1-2 per mm. Septo-costae of adjacent corallites occasionally fused. Underside of corallum not visible.

Remarks: This specimen is very similar to an unidentified recent specimen of coral marked “Faviidae” found in Drawer 47I 1.4, in the NHM Palaeontology department, however as this NHM specimen has not been identified, and there is no information on when and where it was collected, I cannot use it to help with the present identification. I have allied this group with *M. curta* because of the corallite shape and the number of septa per corallite, however the overall size of the calices is smaller in the literature than in this specimen. This specimen also appears to have one less order of septa than in the literature, but the first and second orders may be indistinguishable from one another. The preservation of this specimen has made it difficult to identify accurately. The main features used for this identification are: corallite shape, septal arrangement, columella type and size, and septo-costal structures.

Specimens: Two specimens collected. Reference specimen: SRQ1: 1 (BMNH no. AZ8715).

Figure 133: *Montastraea* aff. *curta* – close up of corallites.

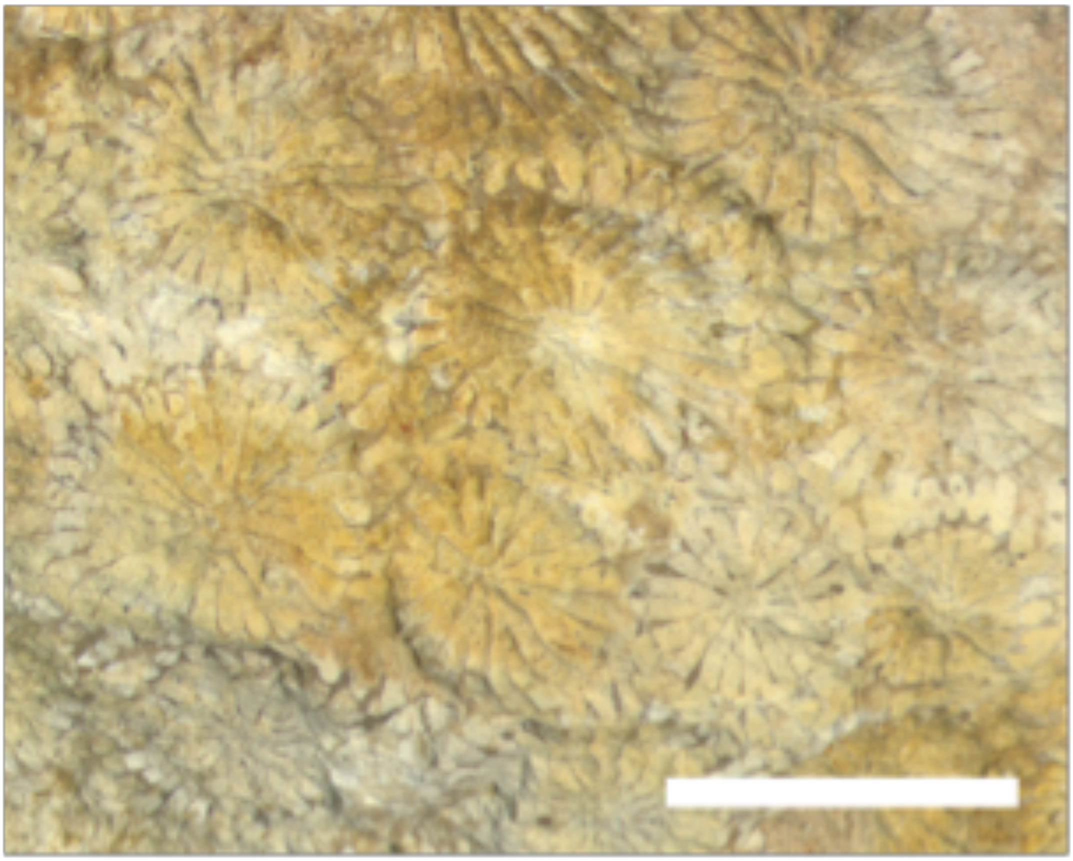


Figure 134: *Montastraea* aff. *curta* – close up of internal detail.

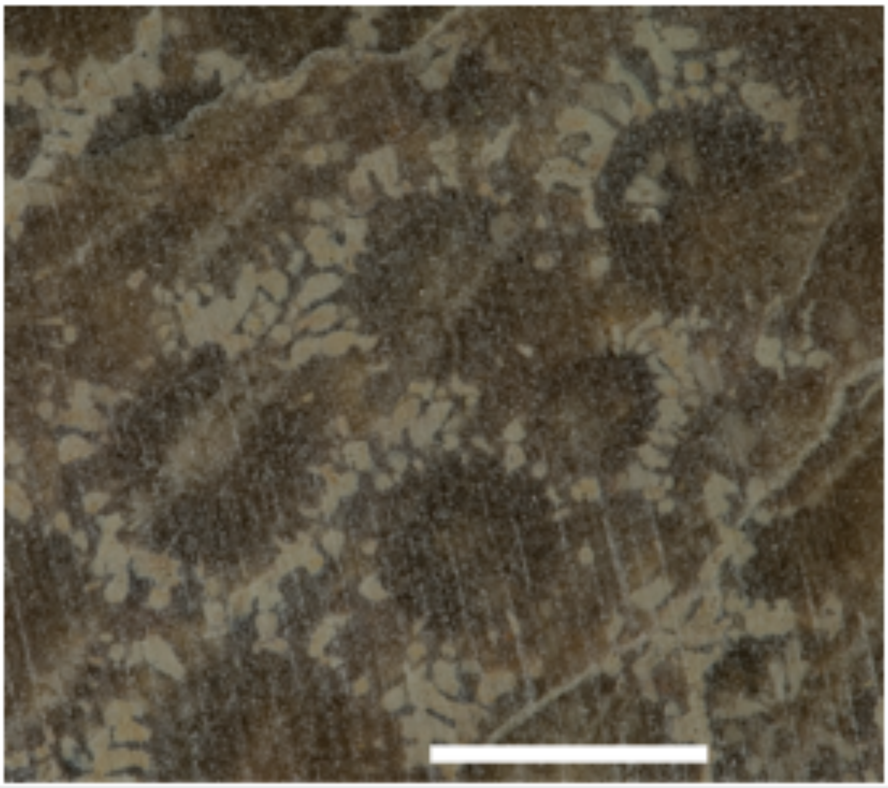
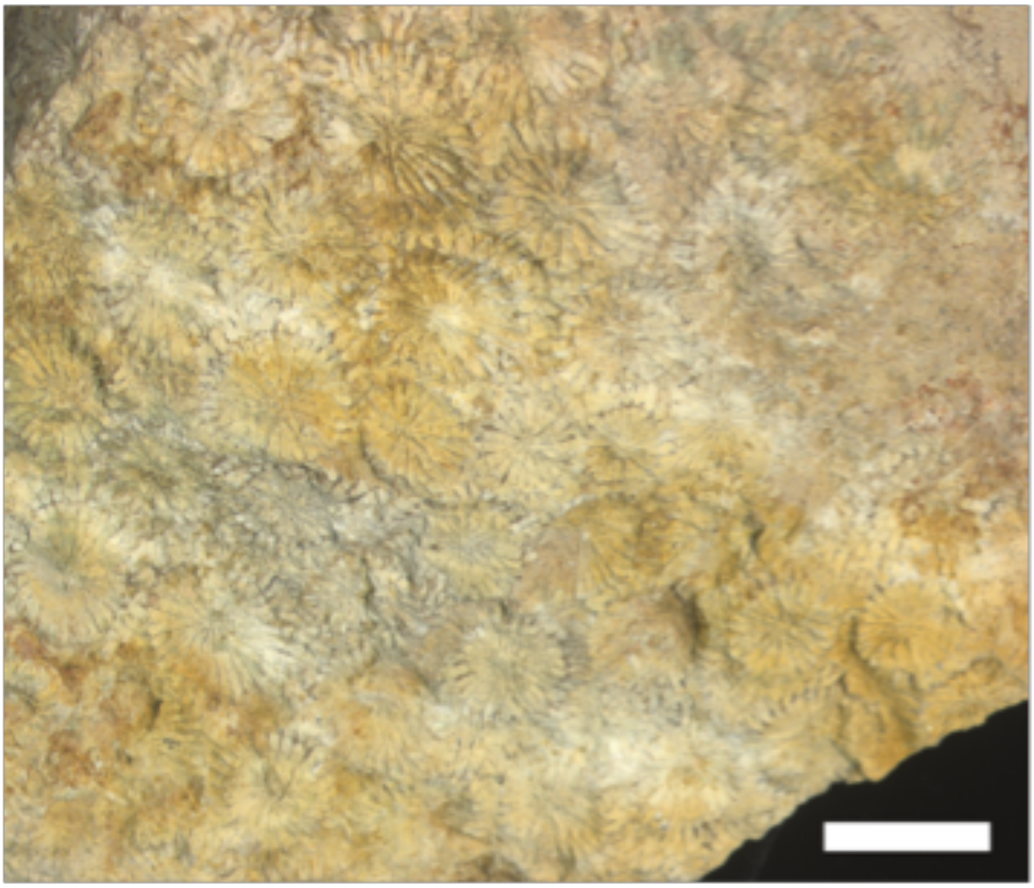


Figure 135: *Montastraea* aff. *curta* – oral surface.



Montastraea aff. *tchihatcheffi* (Chevalier, 1961)

(Figs. 136 and 137.)

Identification Reference(s):

Schuster, 2002. pp. 63-64, Pl. 4, figs. 1-2; figured specimen is from the Burdigalian (Miocene) of Okheider, Gulf of Suez, Egypt.

Description: Massive colony form. Colony type: plocoid. Columella: spongy. Septa: 34-38 per corallite. Septa: slightly exsert at outer wall of calice. Septal spacing: 1-2 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st order septa reaches calice centre, 2nd order reaches 1/2way towards centre, 3rd order, where present, reach 1/3 towards centre. Distal septal margins: uneven, possibly with toothy projections and lobes near columella. Septal faces: slightly lumpy, this was hard to observe due to sediment infilling between septa and poor structural preservation. Calice diameters: 6.3-14.5 mm. Calices slightly raised above coenosteum by approximately 1-2 mm. Calice wall: distinct, crossed by septo-costae. Septo-costal spacing: 0-1 per mm. Some septo-costae appear to merge with adjacent septo-costae, others do not. Corallite spacing: 9.2-20.6 mm. Corallites: circular-/oval-shaped. Extramural budding. Coenosteum: not really visible, but septo-costae extend between corallites. Extracalicular, vesicular dissepiments. Underside of corallum: rounded bumps covered with ridges/costae; bumps are approximately 12 mm wide. There are 1-2 costae per mm.

Remarks: This specimen most closely fits the description of *M. tchihatcheffi* (in Schuster, 2002), which is an Early Miocene species from Egypt. The specimen has slightly fewer septa, the septa are more different in length; it has a slightly larger range of calice diameters, and has extrathecal (or as termed here, extracalicular) dissepiments. For these reasons I have attributed the specimen to a related, but different, species. I have not been able to find the exact species in the literature.

Specimens: One specimen collected, the reference specimen: 1.4.73 a (BMNH no. AZ7520).

Figure 136: *Montastraea* aff. *tchihatcheffi* – close up of corallites.

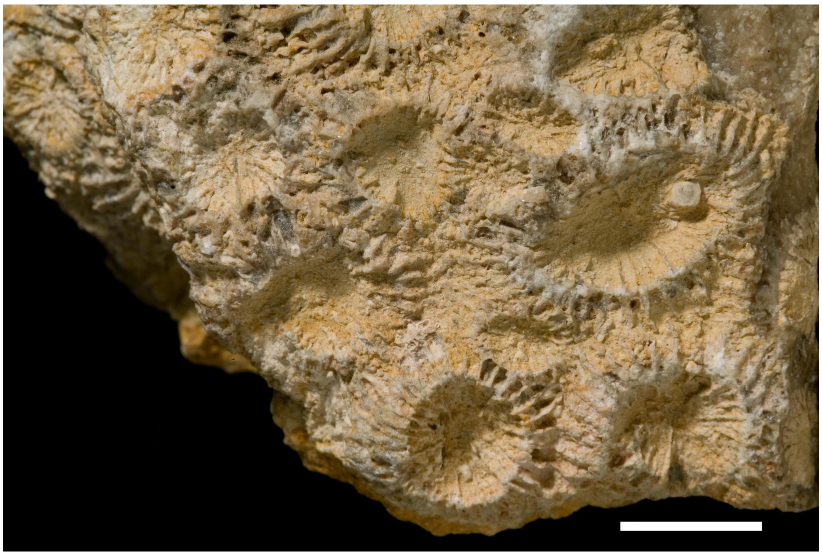


Figure 137: *Montastraea* aff. *tchihatcheffi* – whole specimen.

Montipora **aff.** ***hoffmeisteri*** Wells, 1954

(Figs. 138 and 139.)

Identification Reference(s):

Veron and Wallace, 1984. pp. 22-23, figs. 23-28; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000. Vol. 1. p. 123; specimens photographed are from the Recent of the Great barrier reef, Australia.

Description: Platy colony form. Colony type: plocoid. Columella: not visible. Approximately 12-14 septa per corallite (feature poorly preserved). Septa: not exsert. Septal spacing: approximately 6 per mm. Number of septal orders cannot be distinguished, they are roughly all same length. Septal lengths: not observed as there is sediment infilling calices. Distal septal margins: not visible. Septal faces: too poorly preserved. Calice diameters: 0.4--0.6 mm. Calices: exsert, ≤4.8 mm. Corallite spacing: 1.8-9.6 mm. Corallites: very unevenly spaced; up to 5 adjacent corallites observed merging into one another. Corallite mounds present (called "tuberculae" in Veron and Wallace, 1984): rounded at tops. Sometimes calice openings are slightly offset to side of mounds, rather than directly on top. Calices reach down to base of mounds; observed at broken edge of plate. Extramural budding. Coenosteum: porous. ?Tabular dissepiments (feature poorly preserved). Underside of corallum: porous with raised mounds. Mounds on underside of corallum look like reduced versions of mounds on upper surface. Plate thickness: 2.7-7.5 mm.

Remarks: Resembles *Montipora hoffmeisteri* in Veron and Wallace, (1984), except this specimen has the calices seen only on the tops of the "tuberculae" (or mounds), where as in *M. hoffmeisteri* they can be located in the coenosteum as well. Also the calices in this specimen are just slightly smaller than the range given in Veron and Wallace (1984) for *M. hoffmeisteri*, and this specimen also lacks the epitheca mentioned for *M. hoffmeisteri*. The features used for this identification are: the type of growth form (platy), the size and presence of "tuberculae", the size and structure of the corallites, the porous coenosteum, and the irregular fusion of the "tuberculae".

Specimens: Eight specimens collected. Reference specimen: SaQ: 117 and 118 (BMNH nos. AZ8642 and AZ8643).

Figure 138: *Montipora* aff. *hoffmeisteri* – close up of corallites.

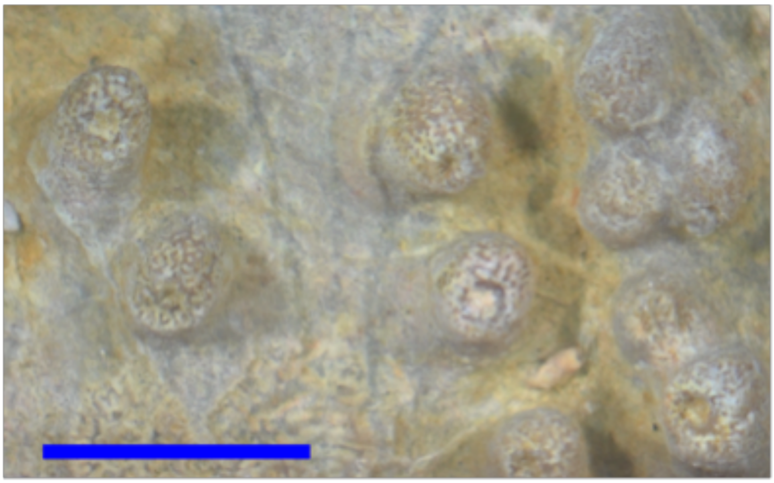


Figure 139: *Montipora* aff. *hoffmeisteri* – oral surface.

Montipora cf. *nodosa* (Dana, 1846)

(Figs. 140 and 141.)

Identification Reference(s):

Veron and Wallace, 1984. pp. 94-97, figs. 242-252 (esp. fig. 245]; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000, Vol. 1. pp. 110-111; specimens photographed are from the Recent of Flinders Reef, Coral Sea, Willis Island, Coral Sea, Sinai Peninsula, Egypt and Ashmore Reef, W. Australia.

Description: Platy colony form. Colony type: plocoid. Columella: not visible. Approximately 12-13 septa per corallite. Septal spacing: approximately 5 per mm. One order of septa observed. All septa reach approximately 1/2 - 2/3 towards the calice centre. Distal septal margins: uneven (feature poorly preserved). Septal faces not preserved well, as there is sediment filling the calice. Calice diameters: approximately 1 mm. Calices located at tops of raised mounds. Calices: tilted at an angle of approximately 45° to surface, mostly in same direction. Corallite spacing: 1.8-5.4 mm. Corallites: very unevenly distributed on upper surface. Corallites observed extending through the coenosteum at 90° to upper surface (observed when looking at edge of corallum plate), possibly the result of having calices tilted in relation to upper/growing surface. Extramural budding. Coenosteum: porous and lumpy. No dissepiments present. Underside of corallum: smooth with occasional growth lines. Plate thickness: 2.3-5.7 mm.

Remarks: This specimen is most similar to *Montipora nodosa*, (in Veron and Wallace, 1984), it has very similar calice diameters but the preservation is so poor that the other features observed above may be incorrect, e.g. the single order of septa observed in the current specimen may possibly be two orders, as observed in modern-day *M. nodosa*. This group also bears a slight resemblance to *Montipora australensis* Bernard, 1897, which may be an allied species, but is probably not as closely related to the present specimens as *M. nodosa*. The features most useful in making this identification are: the size and distribution of the corallites, the number of septa, the porous skeleton, the calices being located on the top of raised mounds (rather than between them), the lack of columella, and the irregularly-spaced calices.

Specimens: Four specimens found. Reference specimen: 1.8.350 (BMNH no. AZ7711).

Figure 140: *Montipora* cf. *nodosa* – close up of poorly preserved corallites.

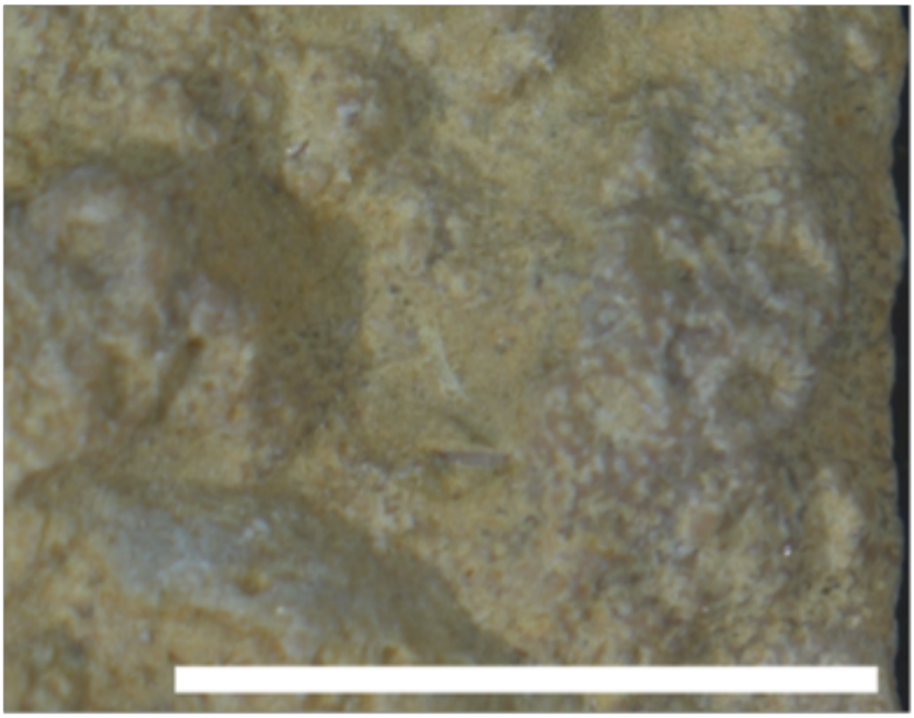
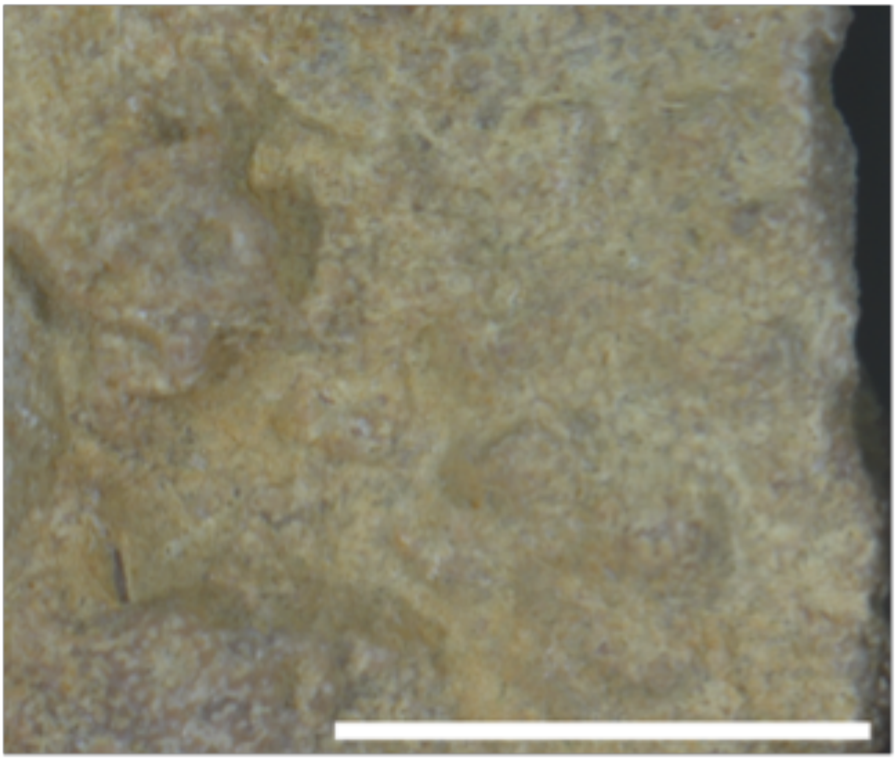


Figure 141: *Montipora* cf. *nodosa* – upper surface.



Montipora ?turgescens Bernard, 1897

(Figs. 142 and 143.)

Identification Reference(s):

Wells, 1956. pp .F374-375, fig. 265, 1b; figured specimen is from the Recent of Bikini Atoll, Marshall Islands. Veron and Wallace, 1984. pp. 39-42, figs. 82-93; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000. Vol. 1. p. 118; specimens photographed are from the Recent of the GBR, Australia, Zanzibar, Tanzania and the Solomon Islands.

Description: Platy/foliose colony form. Colony type: plocoid. Columella: not visible. Approximately 10 septa per corallite (feature poorly preserved). Septa: not exsert. Septal spacing: approximately 4 per mm. Septal orders not observed (feature poorly preserved). Distal septal margins and septal faces: too poorly preserved. Calice diameters: 0.7-1.3 mm. Calices: only exsert on one side; all calices are tilted in one direction. Corallite spacing: 1.9-4.6 mm. Corallites: very unevenly spaced. Extramural budding. Coenosteum: porous. Coenosteum: very uneven and lumpy. No dissepiments present. Underside of corallum: smooth but slightly ridged; probably growth ridges. Plate thickness: 2.3-8.8 mm.

Remarks: Preservation of this specimen is very poor, probably due to it having a highly porous skeleton. I have chosen this identification based only on the growth form and the calice diameter range; therefore I am unsure of the species attribution, as most of the other structural details are not preserved. The features that are most useful for identification are: the lack of columella, the lack of dissepiments, the porous structure of the corallum, and the reduced septa.

Specimens: Two specimens collected. Reference specimen: 4.3.1019 (BMNH no. AZ8042).

Figure 142: *Montipora ?turgescens* – close up of corallites.

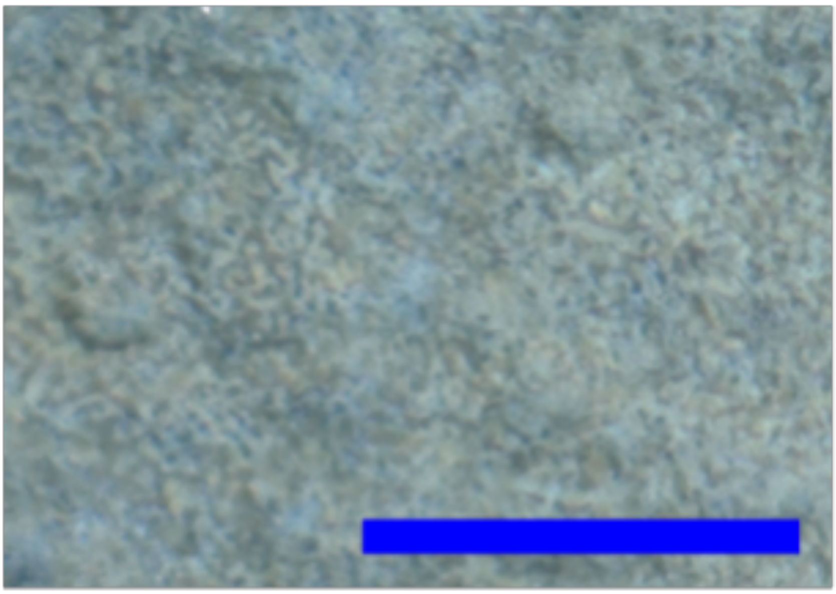


Figure 143: *Montipora ?turgescens* – upper surface.

?Mycedium elephantotus (Pallas, 1766)

(Figs. 144 and 145.)

Identification Reference(s):

Veron and Pichon 1980. pp. 320-325, figs. 564-582; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000. Vol. 2. pp. 344-345; specimens photographed are from the Recent of Papua New Guinea, Houtman Abrolhos Islands, SW Australia, GBR, Australia, Belau, Micronesia, Ryukyu Islands, Japan and Kyushu, Japan.

Description: Platy/encrusting colony form. Colony type: plocoid. Columella: not visible. Twenty or more septa per corallite (feature poorly preserved). Septa: exsert. Septal spacing: 1-3 per mm. Two orders of septa: large, small, large, small etc., although pattern can be irregular in places. Septal lengths:

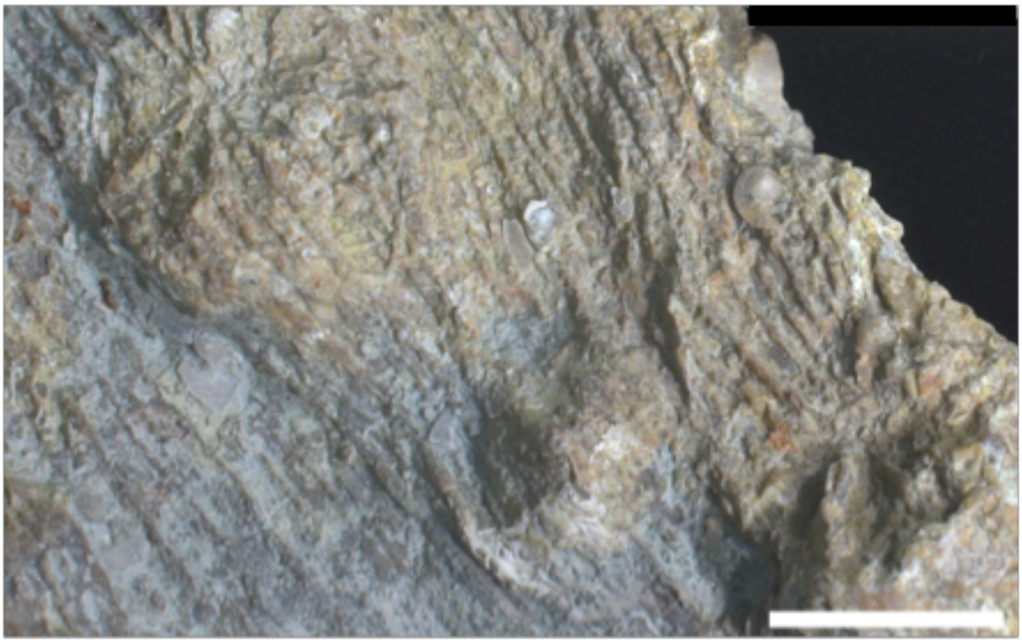
1st order reach calice centre, 2nd order reach ≤2 mm from calice centre. Septal faces: poorly preserved. Calice diameters: approximately 13.4 mm. Calices: exsert. Corallite spacing: approximately 30 mm. Corallites: raised slightly on one side. Coenosteum: covered with septo-costae (appears smooth between septo-costae); 1-3 per mm. Septo-costae extend very straight along corallum surface. Irregular dentations present along all distal margins of septo-costae. Possible vesicular dissepiments present (feature poorly preserved). Underside of corallum: not visible; has *Hydnophora* coral attached on underside. Plate thickness: 0.6-3.4 mm. Very difficult to observe detail on this specimen, as it is so poorly preserved.

Remarks: This specimen is similar to *Mycedium elephantotus* in Veron and Pichon (1980 p. 320-325). The important features for this identification are: the encrusting platy growth form; the tilted corallites; the presence of at least 2 orders of septa, I am presuming the 3rd order has not been preserved here, due to them being delicate structures; dentations along distal septal margins; and the fact that the diameters of the corallites are correct for *M. elephantotus* (in Veron and Pichon, 1980). However the specimen is very poorly preserved, so the measurements, while accurate on the specimen in its current state, may have changed since the specimen was alive. I am unsure of this attribution because of the poor preservation, hence “*?*” status for the genus.

Specimens: Five specimens collected. Reference specimen: 5.-.1405 (BMNH no. AZ8413).

Figure 144: ?*Mycedium elephantotus* – close up of corallite.

Figure 145: ?*Mycedium elephantotus* – 2 preserved corallites.



Oulophyllia sp. *1* Milne Edwards and Haime, 1848

(Figs. 146 and 147.)

Identification Reference(s):

Wells, 1956. pp. F402-F405, fig. 300, 6; specimen figured is from the Recent of the Pacific. This reference specimen was also compared to BMNH specimen: 1886.12.9.101. *(o)Ulophyllia aspera* holotype collected from the Recent of Banda Island, Indonesia? (on the Challenger expedition).

Description: Platy colony form. Colony type: meandroid. Columella: not visible. Septal spacing: 1-3 per mm. Septa often alternate across walls. Septa widen towards centres of valleys. Septa: unevenly spaced along walls. One main order of septa; occasional finer septa observed, but are randomly and sparsely distributed. Septal length: reach centres of valleys; some turn down valleys at approximately 90°. Septa vary widely in length: approximately 2.0-9.0 mm. Distal septal margins: slightly uneven. Septal faces: small pointed bumps/ granules. Possible paliform lobes observed; for most septa these appear to have broken-off. Valley width: 4.0-15.0 mm. Valleys tend to widen at terminus. Valley depth: approximately 1.0-5.0 mm. Continuous valleys. Walls bifurcate. Intramural budding. Intra- and extra-calicular, vesicular dissepiments. Underside of corallum: lumpy ridges, 5.0-10.0 mm wide; with costae, 1-3 per mm. Plate thickness: 5.6-19.2 mm.

Remarks: The features that are useful in identifying this specimen as *Oulophyllia* are: the internal structure, including vesicular dissepiments, a single septal order, the septa turn down the valleys, and the structure of the septa (including distal margins and septal faces). This group is similar to *Oulophyllia crispa* (Lamarck, 1816) (in Veron *et al.*, 1977), but the fossil specimen here is about half the scale of the modern species. When compared to NHM specimen 1886.12.9.101 (*Ulophyllia aspera*) it has the same internal structure of the corallum, and also has septa that turn down the valleys. Other features that confirm this specimen as *Oulophyllia* are that it is meandroid, has a single septal order, and it also has the same overall septal structure as other Oulophylliids.

There may be 2 different species within this group. I have designated a second reference specimen for the second group: PO: 411. This grouping differs as it has much straighter valleys and septa than the original reference specimen (PO: 2004), however it does not have enough different features to exclude the possibility that it could just be an eco-phenotypic variation of the PO: 2004 group.

This group shares some features with present day *Hydnophora* as the septal layout seems quite similar, i.e. the septa are fairly unevenly-spaced as seen in other *Hydnophora* species, however this group has walls that bifurcate, a feature that not present in most *Hydnophora*. It also has more elongated, and less well defined “monticule” structures than observed in other *Hydnophora* species in this work, and I do not regard these structures as true monticules because the septa do not fuse with the wall at the top to form a continuous structure. Therefore I have attributed this species group to the genus *Oulophyllia* rather than *Hydnophora*, although there are some similarities to both genera.

This specimen also resembles species within the genera *Platygyra* and *Leptoria* (as seen in the major references listed in section 3.1), however the septa always lie directly across walls in *Platygyra* and *Leptoria*, and they also grow out straighter from the walls in the latter two genera. In this specimen the septa tend to alternate across the walls and can be quite sinuous.

Specimens: Ninety-six specimens collected. Reference specimen: PO: 2004 (BMNH no. AZ8556).

Figure 146: *Oulophyllia* sp. *1.* – close up of surface.

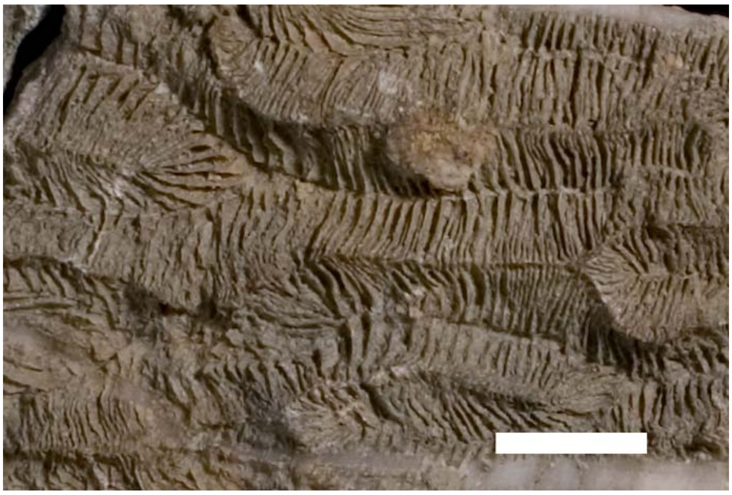


Figure 147: *Oulophyllia* sp. *1.* – whole specimen.

***Pachyseris* aff. *foliosa* Veron, 1990 /*involuta* (Studer, 1877)**

(Figs 148 and 149; also figs. 150 and 151, for specimen group 5a)

Identification Reference(s):

Veron, 2000. Vol. 2, pp.230-231; specimens photographed are from the Recent of Papua New Guinea and Sulawesi, Indonesia. Veron, 1990, pp. 126-128, figs. 31-32 (*P. foliosa* only); specimens pictured are the Holotypes from the recent of the Philippines (Puerto Galera).

Description: Platy/Encrusting colony form. Colony type: asymmetric-meandroid. Columella: not present or not visible. Septal spacing: 3-4 per mm. Septa: slightly exsert. All septa are even in size. Septa reach centres of valleys. Distal septal margins: smooth. Septal faces: slightly lumpy, and are hard to observe - sediment infilling between septa. Valley widths: 2.5-11.5 mm. Valley depth: <1 mm. Valleys discontinuous. Valleys have one wall that folds over towards other; this is presumably the side supporting the underside of polyps. Walls do not bifurcate, they are continuous with coenosteum. Septo-costae present over upper surface; 4-5 per mm. Septo-costae: Very regular; extend across entire surface in same direction, at 90° to valley formation. Coenosteum: same structure as walls, is covered in septo-costae. Coenosteum: relatively flat between valleys. Extramural budding. Underside of corallum: lightly striated with costae; 5-6 per mm. Plate thickness: 1.5-5.1 mm.

Remarks: This specimen is similar to both *Pachyseris foliosa* and *Pachyseris involuta* in Veron (2000), as it has structural similarities to both species. The valleys fold much like *P. foliosa*, but they are similar in length to those of *P. involuta*. This may be an ancestor to both groups, but further comparison to type specimens is required. The features used for this identification are: septal structure and pattern (see description), colony type and growth form, the coenosteum is covered with parallel septo-costae, one side of all valleys are raised to form a "lip" structure, the corallum is unifacial.

Specimen group 5a may be the early growth stage of group 5 (the Pachyseris aff. foliosa/involuta group), as they look very similar, or it may be a separate species as it is forms a thinner plate and has less folded valleys. It is perhaps a *Leptoseris sp.* – possibly *Leptoseris amitoriensis* Veron, 1990 (seen in Veron, 1990). For now groups 5 and 5a are placed together, but further assessment is warranted.

Specimens: Forty-nine specimens collected. Reference specimen: 2.1.419 (BMNH no. AZ7758).

Figure 148: *Pachyseris* aff. *foliosa/involuta* – close up of valleys.

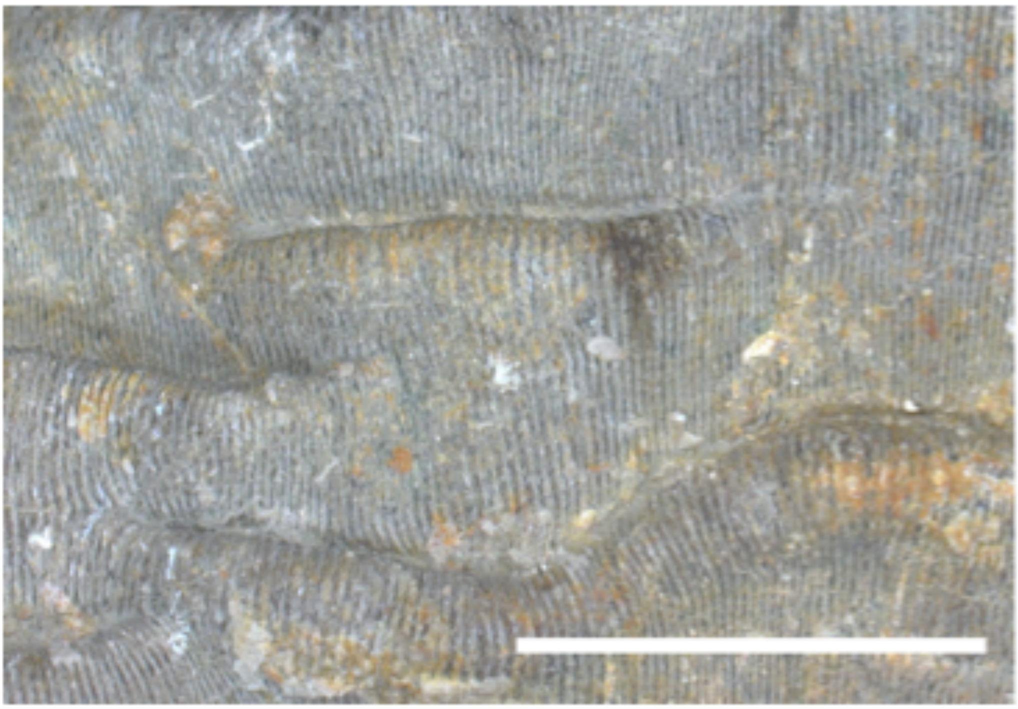


Figure 149: *Pachyseris aff. foliosa/involuta* – upper surface.

Figure 150: *Pachyseris aff. foliosa/involuta* specimen group 5a

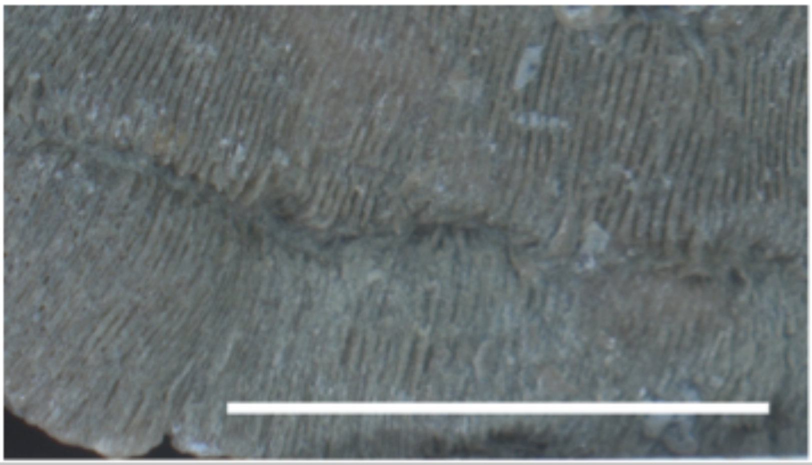
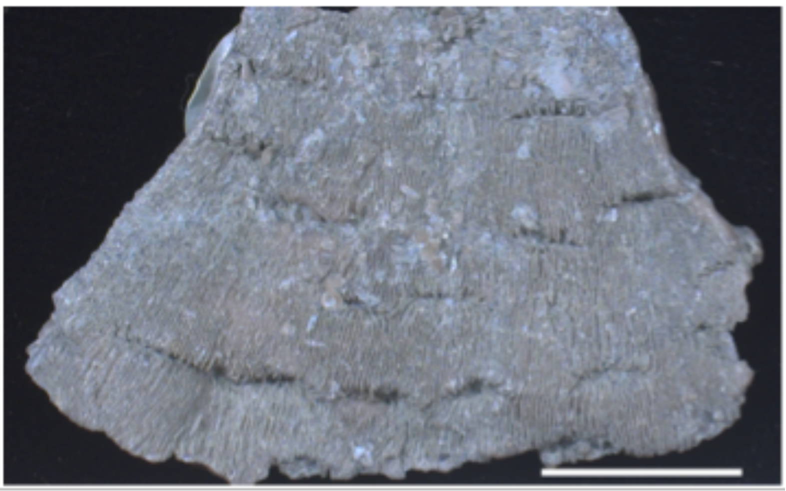


Figure 151: *Pachyseris aff. foliosa/involuta* specimen group 5a



Pachyseris speciosa (Dana, 1846)

(Figs. 152, 153 and 154.)

Identification Reference(s):

Veron, 2000. Vol.2, pp. 228-229; specimens photographed are from Sinai peninsula, Egypt, GBR, Australia, Apo Island, Philippines and the Ryukyu Islands, Japan. Veron and Pichon, 1980, pp. 82-84, figs. 138-143; figured specimens from eastern Australia. Gerth, 1923, p. 113, Pl. 8, fig 6 figured specimen from the Miocene of Borneo.

Description: Platy colony form. Colony type: meandroid. Columella: either platy/non-existent (feature poorly preserved). Septal spacing (measured near valley centres): 4-5 septa per mm. Septa: slightly exsert. Septa: bend towards centres of valleys. Two septal orders: large, small, large, small etc. Septa reach centres of valleys (some cross over valley centre by small amount). Distal septal margins: slightly uneven. Septal faces: slightly lumpy, but this was hard to observe due to sediment infilling between septa. Valley widths: 3.9-13.3 mm. Valley depths: approximately 1-4 mm. Valleys: discontinuous. Walls bifurcate (walls, in this case, are defined as the space between valley centres). Hard to distinguish walls as coenosteum is convex between valleys, and septo-costae extend entire length of upper surface, except where interrupted by valley centres. Septo-costae: present on upper surface; 3-4 per mm. Septo-costae: extend at 90° to valley lengths. Septo-costae: very regularly spaced. Extramural budding. Coenosteum: same structure as walls. Tabular dissepiments: present throughout internal structure. Underside of corallum: lightly striated with costae; 4-6 per mm. Plate thickness: 2.8- 13.8

mm. Both sides of valley centres are symmetrical, unlike asymmetric "lip" in *Pachyseris aff. foliosa/involuta*.

Remarks: This specimen resembles *Pachyseris speciosa* in Veron (2000) and Veron and PIchon (1980). It looks almost identical to *Pachyseris speciosa* pictured in Gerth (1923) from Borneo, so I am confident of this species attribution. The features used for this identification are: septal structure and pattern (see description), colony type and growth form, the coenosteum is covered with parallel septo-costae, the corallum is unifacial, and the coenosteum is convex between valleys.

Specimens: Ninety-two specimens collected. Reference specimen: LSa: 2006 (BMNH no. AZ8480).

Figure 152: *Pachyseris speciosa* – close up of septo-costae.

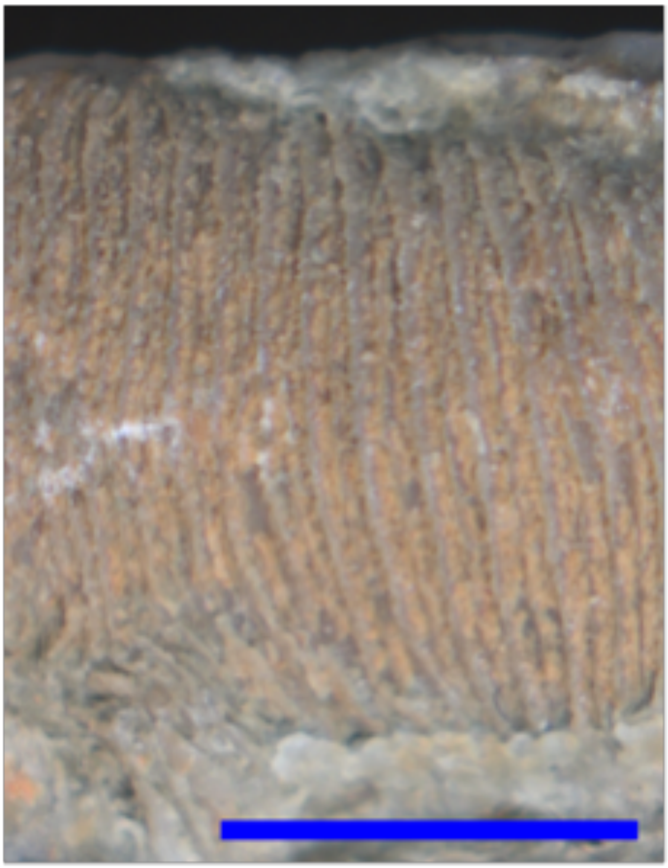


Figure 153: *Pachyseris speciosa* – close up of valley.

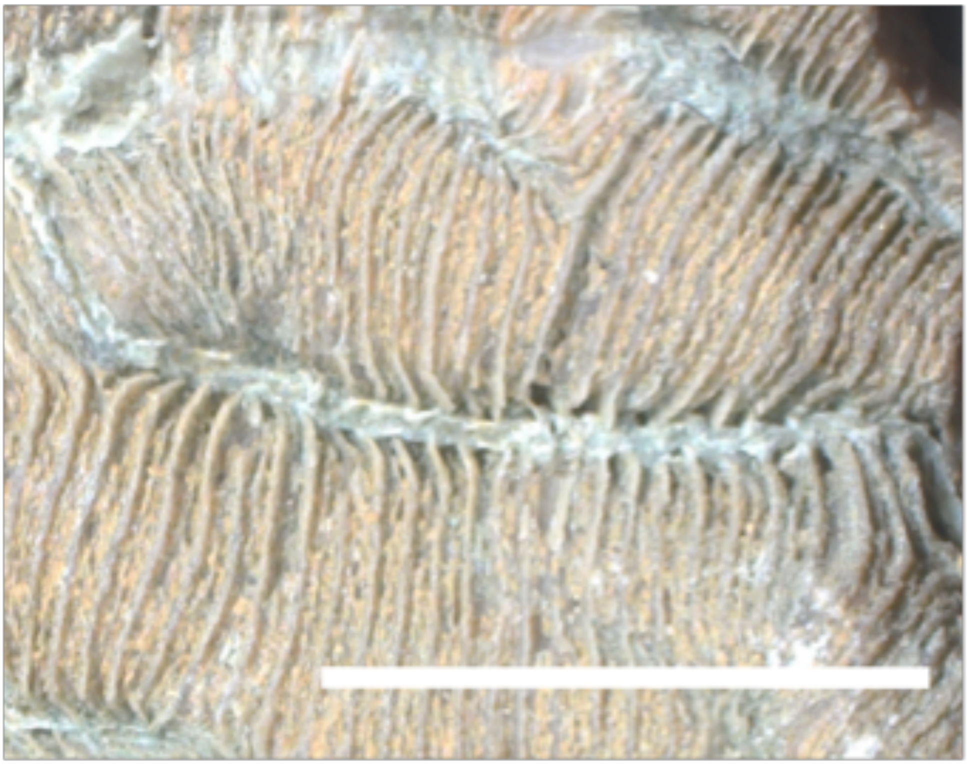
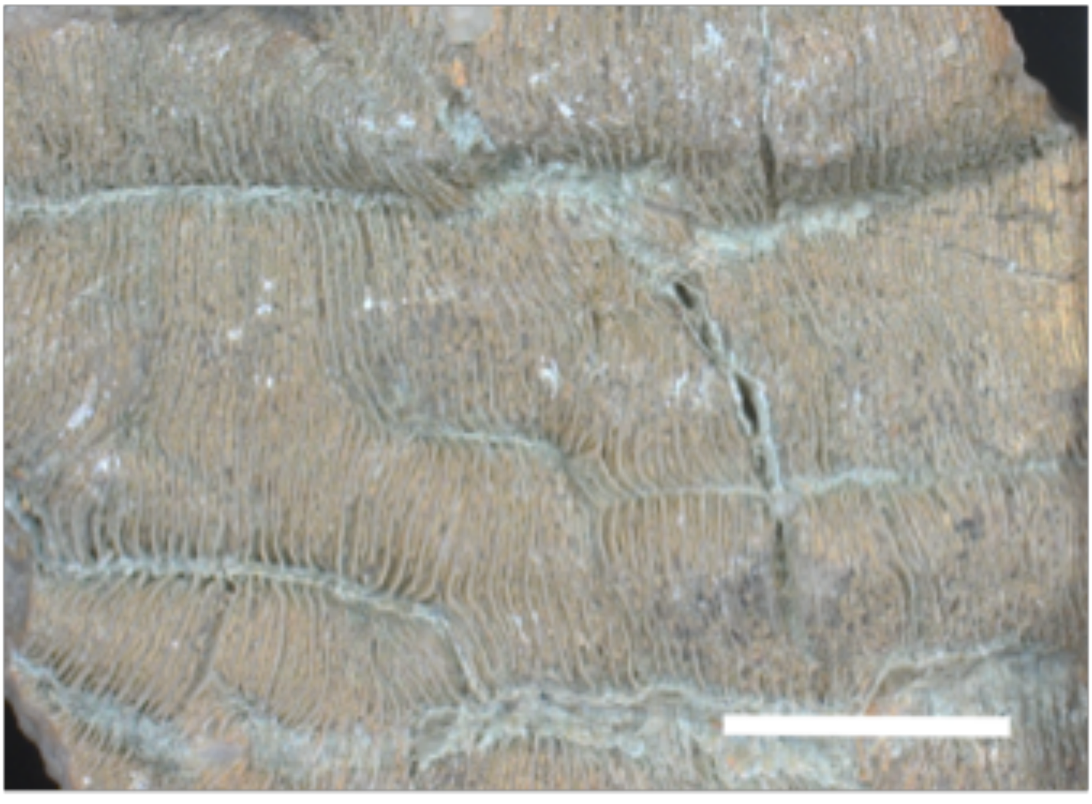


Figure 154: *Pachyseris speciosa* – upper surface.



Palauastrea* cf. *ramosa Yabe and Sugiyama, 1941

(Figs. 155 and 156.)

Identification Reference(s):

Veron and Pichon, 1976. pp. 71-75, figs. 151-157; specimens pictured are recent species collected from reefs in eastern Australian waters.

Description: Branching colony form. Colony type: cerioid. Columella: ?styliform (feature poorly preserved). Septa: 12 per corallite. Septa: not exsert. Septal spacing: 3-5 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order septa reach columella, 2nd order reach ≤1/2way to columella. First order septa are thicker than others. Distal septal margins: slightly uneven. Septal faces: not well preserved. Calice diameters: 0.9-2.2 mm. Calices: mostly circular. Corallite spacing: 1.3-2.6 mm. Extramural budding. Branch diameter: approximately 31.1 mm; only a partial specimen found, so measurement may not be accurate. Coenosteum: porous or knobbly (feature poorly preserved).

Remarks: The reference specimen fits well to the description of *P. ramosa* in Veron and Pichon (1976), but because of the poor overall preservation, especially of the columella, I have given this group "cf." status until comparison to type specimens proves the identification to be accurate. The useful identifiers for this specimen are: the septal number and layout, the size of the corallites, the styliform columella, and the reduced second septal order.

Specimens: Two specimens collected. Reference specimen: 1.5.155 (BMNH no. AZ7563).

Figure 155: *Palauastrea* cf. *ramosa* – close up of corallites.

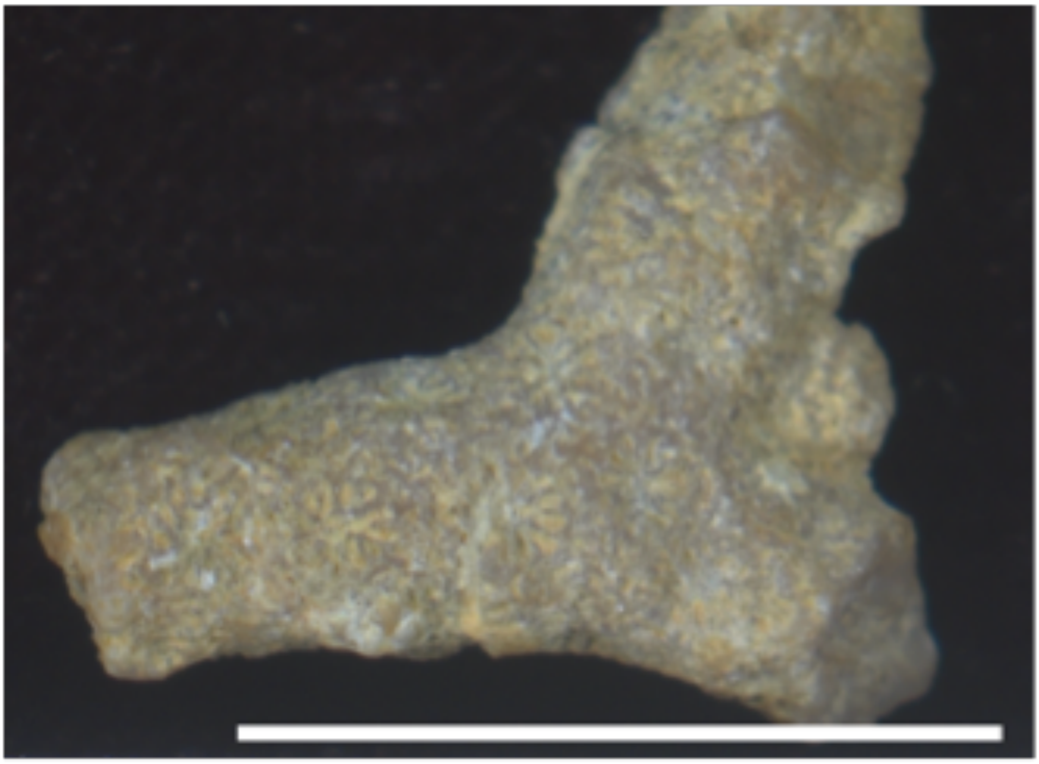
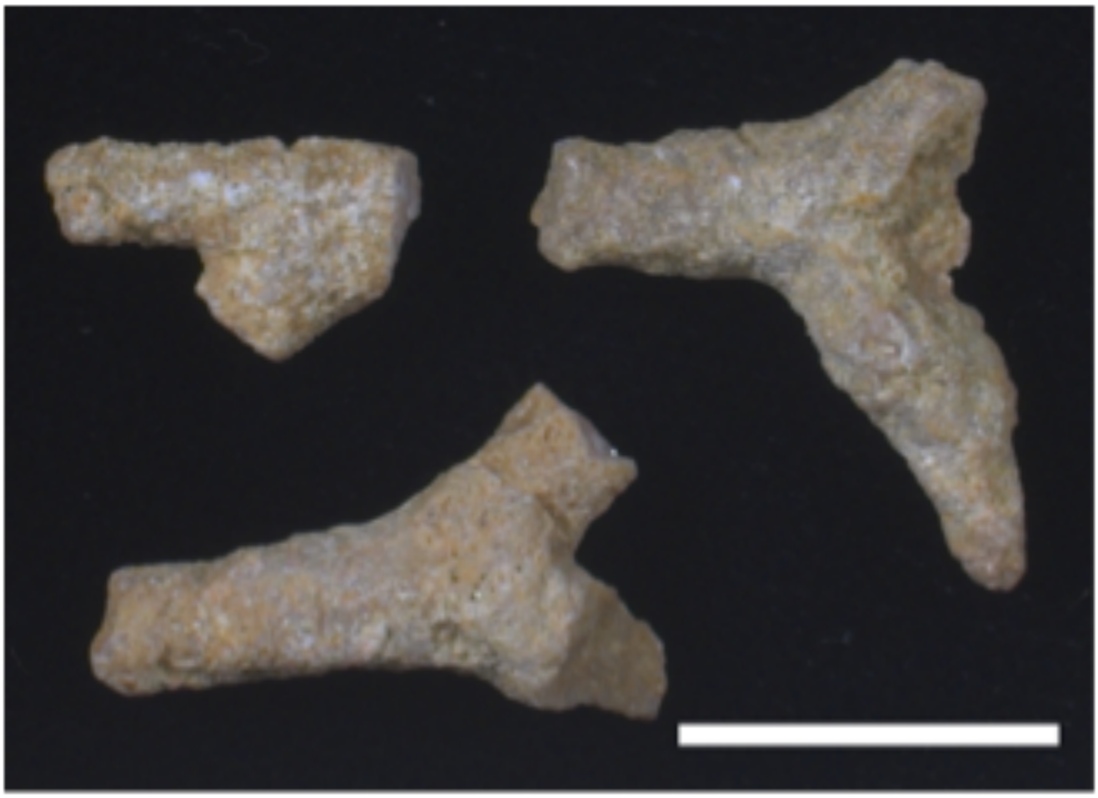


Figure 156: *Palauastrea* cf. *ramosa* – 3 specimens.



Platygyra (Coeloria)* cf. *daedalea (Forskål)/(Ellis and Solander, 1786)

(Figs. 157 and 158.)

Identification Reference(s):

Umbgrove, 1946 p. 528, Pl. 79, fig. 7; figured specimen is from the Lower Pliocene of Central Java. Leloux and Renema, 2007. p. 26, pl. 34, figs 10 and 11; figured specimens are from the Lower Pliocene near Gunung Linggapadang, Java, Indonesia (RGM.77586). Veron *et al.* 1977 p. 98-103, figs. 191, 193-4; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000, Vol. 3. p. 191; specimens photographed are from the GBR, Australia and the Calamian Islands, Philippines.

Description: Platy colony form. Colony type: meandroid. Columella: not visible. Septal spacing: 1-2 per mm. Septa: not exsert. Septa line-up across valley walls. All septa: even in size. Septa: sinuous. Septa: slightly unevenly spaced along walls. All septa reach centres of valleys, some cross over valleys or turn down valleys by a small amount. Distal septal margins: uneven, with possible large lobes towards valley centres. Septal faces: smooth/possibly with small pointed projections (feature poorly preserved). Valley widths: 2.4-7.2 mm. Valley depths: approximately 1.5-4.0 mm. Continuous valleys, although this is a small piece of larger plate, so valley termini may not be preserved. Valleys exhibit very uneven widths, some look almost like cerioid calices that are open at one side. Valleys: sinuous. Walls bifurcate. Underside of corallum: uneven, with fans of costae extending in same direction as valleys. Costal spacing: 1-2 per mm. Plate thickness: 6.4-27.5 mm.

Remarks: This specimen fits the description and figures of *Coeloria cf. daedalea* in Umbgrove (1946), and appears identical to *Coeloria daedalea* in the Gerth Collection (Leloux and Renema, 2007). The modern day species is also depicted in Veron *et al*. (1977) and Veron (2000).

Specimens: One specimen collected, the reference specimen: 1.5.143 (BMNH no. AZ7555).

Figure 157: *Platygyra (Coeloria)* cf. *daedalea* – close up of valleys.

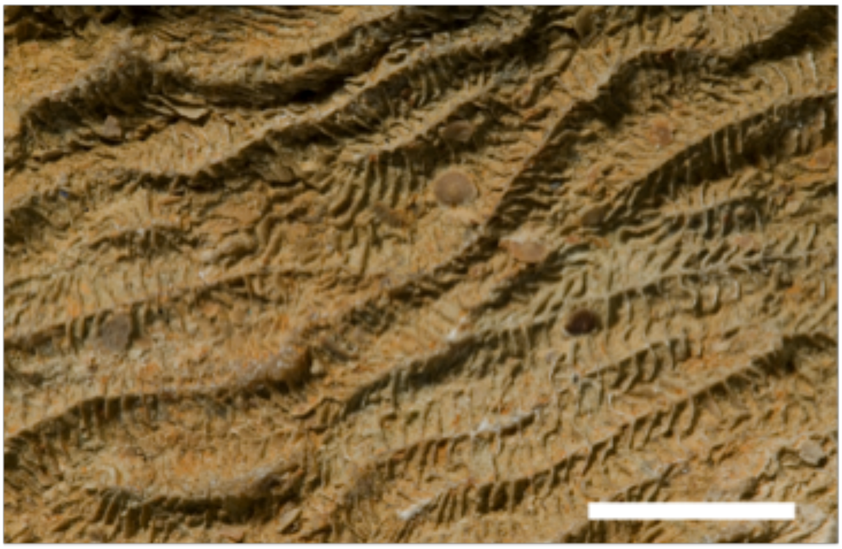
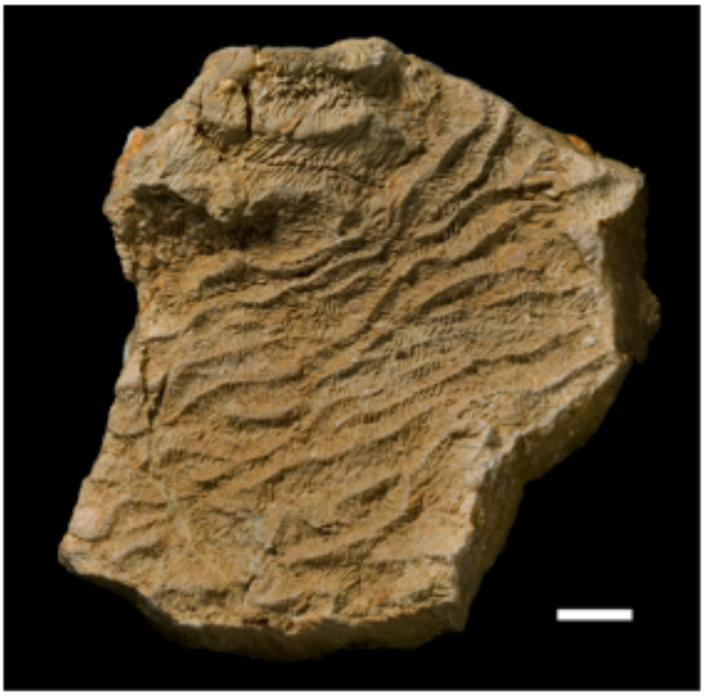


Figure 158: *Platygyra (Coeloria)* cf. *daedalea* – whole specimen.



Platygyra* cf. *lamellina (Ehrenberg, 1834)

(Figs. 159 and 160.)

Identification Reference(s):

Veron *et al*. 1977. pp. 103-105, fig. 199; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000. Vol. 3. pp. 192-193; specimens photographed here are from the Recent of the Calamian Islands, Philippines, Houtman Abrolhos Islands, SW Australia and the GBR, Australia.

Description: Platy colony form. Colony type: meandroid. Columella: platy. 2-3 septa per mm. Septa: regularly spaced along walls. Septa: lined-up across walls. Septa: generally formed at 90° to walls. Septa widen towards valley centre with T-shaped structures at ends. One, or possibly 2 septal orders (feature poorly preserved): large, small, large, small etc. Small septa may not be real septa; preservation is too poor to tell for certain. Septa: reach the centres of valleys. Distal septal margins: slightly uneven-smooth. Septal faces: not preserved well, may have granulose ornamentation? Valley width: 4.2-7.1 mm. Valley depth: approximately 1 mm. Valleys continuous. Valleys: very straight (as opposed to sinuous). Walls bifurcate; these bifurcations are Y-shaped). Underside of corallum: rough and lumpy. Plate thickness: approximately 3.5-9.6 mm.

Remarks: The reference specimen bears a resemblance to the specimen photographed in fig. 199 in Veron *et al.* (1977). The specimen from this work is not very well preserved, so further comparison to type specimens is warranted. The valley widths and septal spacing are correct for identification as *P. lamellina*.

Specimens: Two specimens collected. Reference specimen: 1.3.61 (BMNH no. AZ7506).

Figure 159: *Platygyra* cf. *lamellina* – close up of valleys.

Figure 160: *Platygyra* cf. *lamellina* – whole specimen.

aff. *Platygyra (Coeloria) naroetensis* Gerth, 1923

(Figs. 161 and 162.)

Identification Reference(s):

Leloux and Renema, 2007. p. 26, pl. 35, figs. 3-4; figured specimen is the syntype from the Miocene of Timur, Indonesia.

Description: Massive colony form. Colony type: cerio-meandroid. Columella: not visible. Eighteen or more septa per corallite. Septa: not exsert. Septal spacing: 2-3 per mm. Septa: often bend round and follow along valleys at centres. Three septal orders: large, small, medium, small, large etc. Septal lengths: 1st order of septa reach columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/4 or less towards columella. First order septa appear thicker and slightly taller than other septa. Distal septal margins: uneven, possibly with toothy projections – but most are broken-off. Septal faces: small pointed bumps/granules. Calice diameters: 2.7-4.7 mm (for round calices). Corallite spacing: 3.1-6.3 mm. Corallites are sub-plocoid in places. Corallites are a mix of circular, elongated with 2-3 centres, or meandroid with more then 3 centres. Valley width: same as corallite spacing values. Valleys: ≤3.9 mm in depth. Valleys discontinuous. Walls bifurcate. Lamellar/trabecular linkages present in centres of the valleys. Extratentacular budding. Vesicular dissepiments: intracalicular, and between septa. Underside of corallum: not visible. This specimen is very poorly preserved.

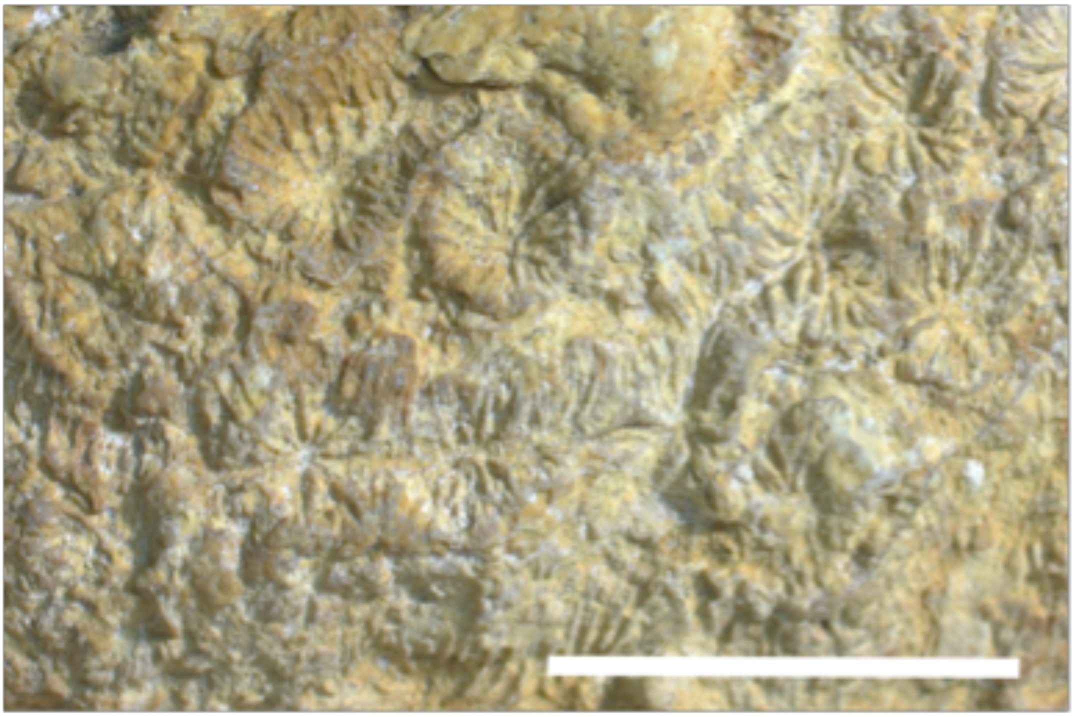
Remarks: It has been hard to attribute this specimen to a species, as it is not well preserved, and I have had trouble working out whether it should be in the genus *Goniastrea, Leptastrea* or if it is *Coeloria naroetensis* from the

Gerth Collection because all have similar septal structures, and all have a tendency towards being cerio-meandroid. I have decided on *Coeloria naroetensis* as seen in the Gerth Collection (Leloux and Renema, 2007; Pl. 35, figs 3-4.), because it is the right scale and appears to match many of the features listed above; it is also close in age to the current specimen. The genus *Coeloria* has been synonymised with *Platygyra* since the Gerth Collection specimens were identified, hence the present specimen being attributed to the genus *Platygyra*. Further comparison to type specimens should be carried out in order to gain an accurate identification.

Specimens: One specimen collected, the reference specimen: 1.7.231 (BMNH no. AZ7607).

Figure 161: aff. *Platygyra (Coeloria) naroetensis* – close up of corallites.

Figure 162: aff. *Platygyra (Coeloria) naroetensis* – upper surface.



Plesiastrea aff. *versipora* (Lamarck, 1816)

(Figs. 163 and 164.)

Identification Reference(s):

Wells, 1956. p. F401; pictured specimen is from the Recent of the Torres Strait, Australia. Veron *et al.*, 1977. pp. 149-153, figs. 284-294; specimens pictured are recent species collected from reefs in eastern Australian waters.

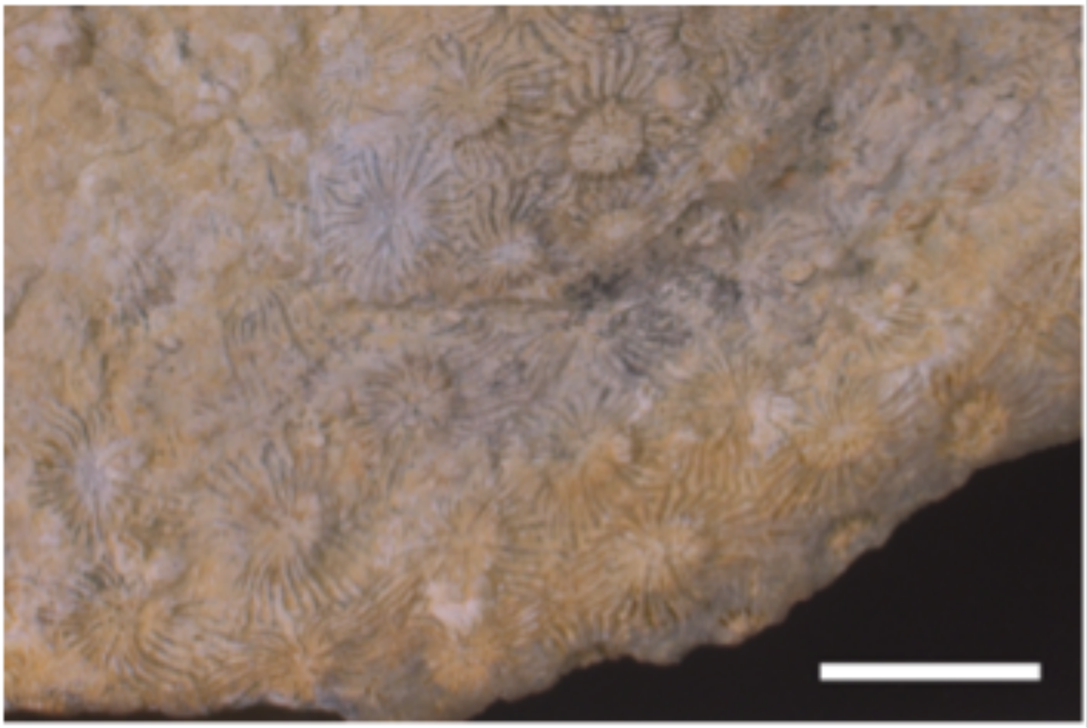
Description: Platy colony form. Colony type: plocoid. Columella: ?spongy. Septa: 27-36 per corallite. Septa: slightly exsert (at outer wall of calice). Septo-costae: fuse in some places, but not in others (could be preservation). Septal spacing: 2-4 per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st order septa reach columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/4 or less towards columella. Distal septal margins: uneven and bumpy. Septal faces: small bumps/projections (feature poorly preserved). Calice diameters: 2.8-4.2 mm. Calices: exsert by <1 mm. Corallite spacing: 5.1-10.1 mm. Corallites: oval-shaped, have longest diameter oriented in same direction. Extratentacular budding. Coenosteum: covered with septo-costae; 2-3 per mm. Tabular dissepiments present. Underside of corallum is smooth; some folds occur from centre outwards (like ripples in a pond). Plate thickness ranges: 0.7-9.5 mm. Calice theca is thin; is a similar width to septa.

Remarks: This specimen fits well to part of the description of *Plesiastrea versipora* in Veron *et al.* (1977), but differs in that the calice diameters are larger in this specimen and that the corallites appear oval in shape, although this may be partly down to preservation. Further study is necessary for accurate identification.

Specimens: Two specimens collected. Reference specimen: MQ2: 164 (BMNH no. AZ8543).

Figure 163: *Plesiastrea* aff. *versipora* – close up of corallites

Figure 164: *Plesiastrea* aff. *versipora* – upper surface.



Podobacia crustacea (Pallas, 1746)

(Figs. 165, 166 and 167.)

Identification Reference(s):

Veron, 2000. Vol. 2. pp. 310-311; specimens photographed here are from the Recent of Cebu, Philippines, Ryukyu islands, Japan, GBR, Australia and the Calamian Islands, Philippines. Veron and Pichon, 1980. pp. 197-200, figs. 324-327; specimens pictured are recent species collected from reefs in eastern Australian waters.

Description: Foliaceous colony form. Colony type: ?plocoid; is a central mouth surrounded by secondary centres. Columella: not visible. Approximately 43 septa in central mouth; 10-25 septa per corallite in secondary mouths. Septa are exsert (are septo-costae). Septal spacing: 3-4 per mm. Two orders of septa: large, small, large, small etc. Larger septa vary in thickness. Most septa reach calice centres. large septa "bulge" (thicken in both axes) at certain points along their lengths; also around corallite centres. Distal septal margins: granulations along them; occasional large lumps are present on larger septa. Septal faces: covered in tiny granulations. Calices: not exsert. Corallite spacing: 1.8-8.5 mm. Extramural budding. Coenosteum: covered with septo-costae; 2-3 per mm. Main central mouth: 4 or 5 large, wide, highly exsert septa. Secondary centres: irregularly spaced. Underside of the corallum: feint septo-costae; 2-3 per mm. Plate thickness: 1.9-3.7 mm.

Remarks: This specimen appears almost exactly the same as *P. crustacea* in Veron (2000), and Veron and Pichon (1980). It has slightly slimmer septo-costae: there is at least one more per mm than in the depicted modern specimens, but that appears to be the only difference, and could be within normal intra-species variation. The specimen (*Podobacia crustacea*) appears to have many features in common with genera such as *Pachyseris* and *Leptoseris*, such as the granulations on the septa, and the coenosteum that is covered with septo-costae. I think it is possible that this genus should be attributed to the Agariciidae, but a full taxonomic work-up is beyond the scope of this paper. Assuming this identification is correct, this is the oldest record of *Podobacia crustacea* so far recorded, as the previous earliest occurrence is recorded as Pliocene in Veron (2000).

Specimens: Two specimens collected. Reference specimen: 4.3.953 (BMNH no. AZ8063).

Figure 165: *Podobacia crustacea* – septo-costae.

Figure 166: *Podobacia crustacea* – close up of secondary mouth.

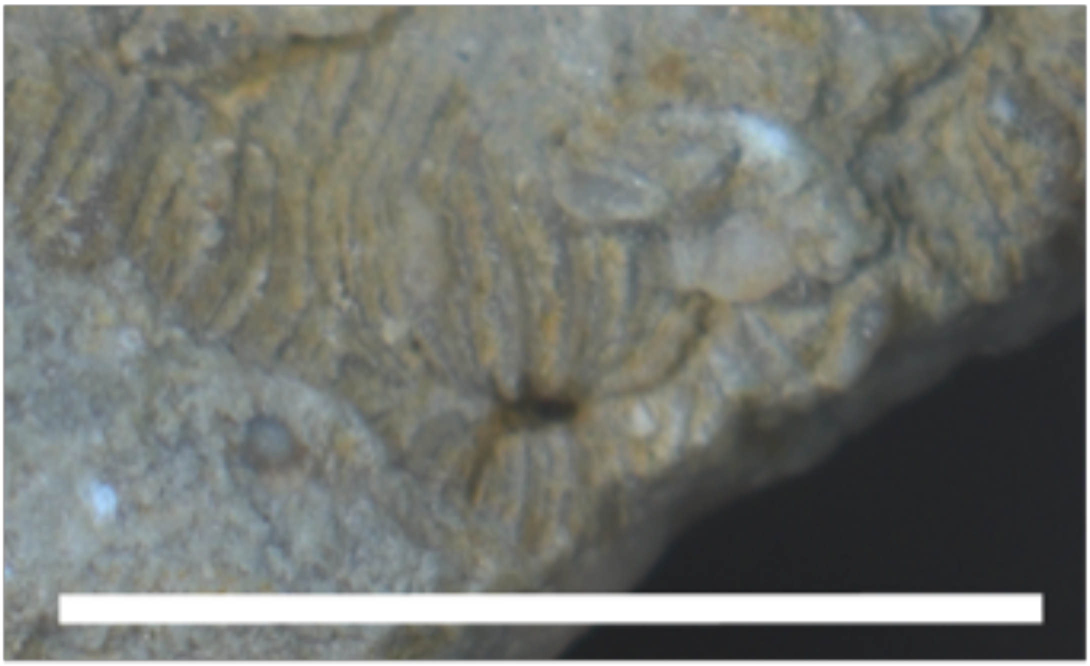
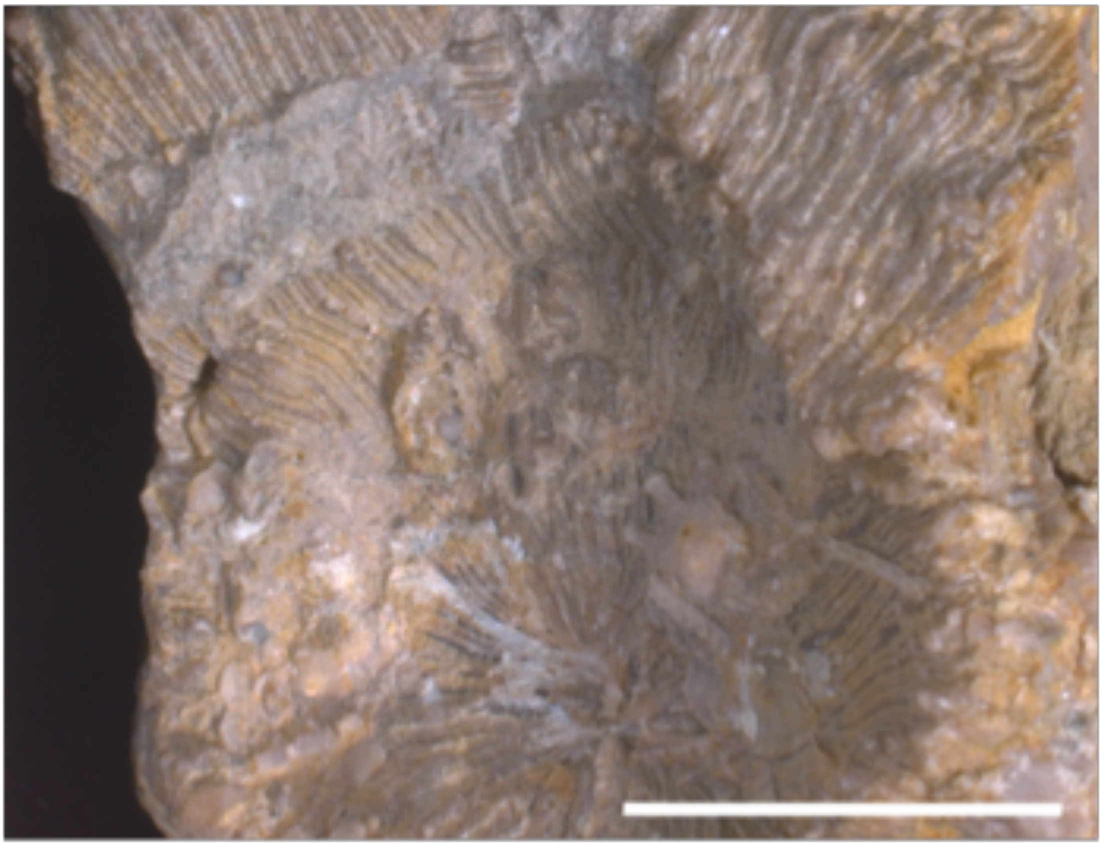


Figure 167: *Podobacia crustacea* – oral surface.



Porites sp.*1* (platy form) Link, 1807

(Figs. 168 and 169.)

Identification Reference(s):

Wells, 1956. pp. F393-394; illustrated specimens are from the Recent of the West Indies and Bikini Atoll, Marshall Islands.

Description: Platy, cerioid coral. Columella: axial pillar (looks styliform). Septa: 12 per corallite. Septa are not exsert. Septal spacing: 3-4 per mm. 1 order of septa. All septal orders reach approximately 1/2 - 2/3 towards calice centre. Distal septal margins: 3-4 rounded, upward-projections along them. Septal faces not seen as there is sediment infilling calice. Calice diameters: approximately 1.6 mm. Corallite spacing: 1.6-2.6 mm. Extramural budding.

Coenosteum: porous. Tabular dissepiments. Underside: slightly porous (feature poorly preserved). Plate thickness ranges: approximately 8.8-22.5 mm. Entire corallum structure: porous.

Remarks: This specimen has larger calice diameters than any of the *Porites* species seen in the literature. This may mean it is a novel species. This group has been separated from the other *Porites* species in this study by growth form only, so it may be that there is more than one species contained within this group. Further study is warranted, but may be difficult due to the poor preservation of the poritid corals collected in this study.

Specimens: Ninety specimens collected. Reference specimen: 1.3.40 (BMNH no. AZ7490).

Figure 168: *Porites* sp. *1* (platy form) – internal corallite detail.

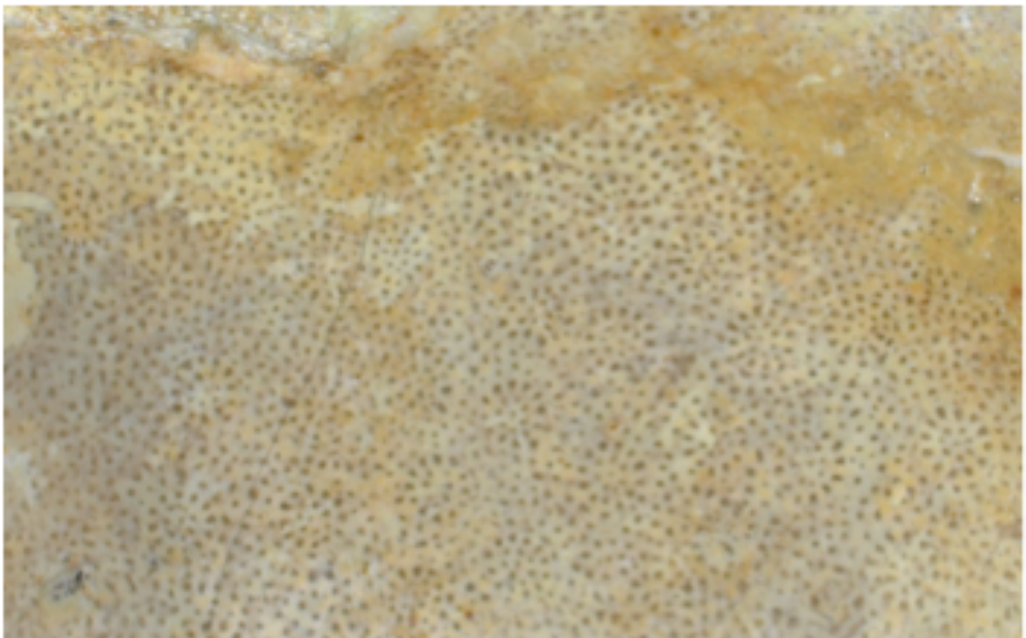
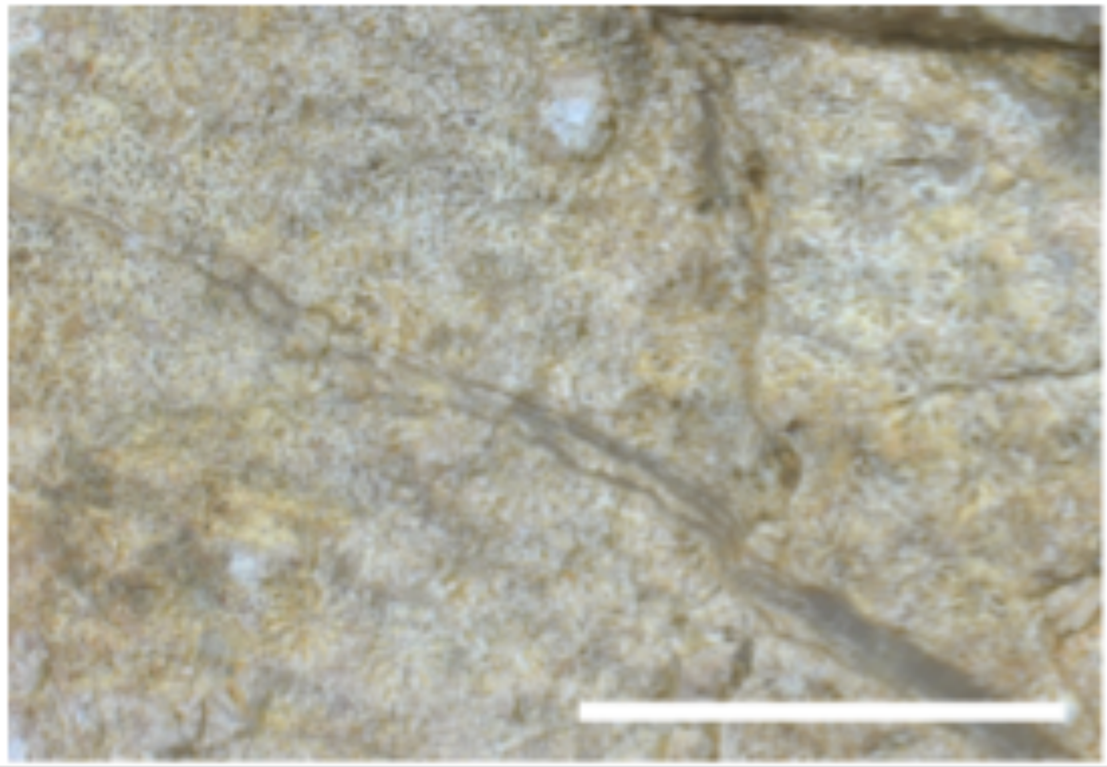


Figure 169: *Porites* sp. *1* (platy form) – oral surface.



Porites sp. *2* (branching form) Link, 1807

(Figs. 170, 171 and 172.)

Identification Reference(s):

Wells, 1956. pp. F393-394; illustrated specimens are from the Recent of the West Indies and Bikini Atoll, Marshall Islands.

Description: Branching, cerioid coral. Columella: spongy (feature poorly preserved). Septa: 12-14 per corallite. Septa: porous structure. Septa are not exsert. Septal spacing: 3-4 per mm. Two orders of septa (feature poorly preserved); all appear to be of similar length but are different thicknesses. Most septa reach the calice centre (feature poorly preserved). Distal septal margins: 3-4 rounded, upward-projections along them. Calice diameters: 1.0-2.1 mm. Corallite spacing: 1.6-3.0 mm. Corallites: roughly round in shape.

Extramural budding. Coenosteum: porous. Tabular dissepiments. Plate thickness: approximately 8.7-21.2 mm. Entire corallum structure: porous. Branches narrow slightly at tips.

Remarks: Given that the corallite size and spacing ranges, and other features of this specimen are similar to the platy form, it is possible that this specimen is an ecomorph of the platy form. This plasticity of growth is thought to occur in another fossil member of the Poritidae, *Actinacis rollei* (Bosellini and Russo, 1995), and I believe that it may also be the case for this *Porites* species. This is further backed-up by the fact that most of the branching forms of both *Porites* and *Actinacis* have been found at the same locality: Sanctuary Quarry, while the platy forms of both were found at various other localities. However, until further study proves they are the same species, I am leaving the platy and branching forms separate.

There may be 2 species within this branching group: one with slightly smaller, rounder corallites (e.g. 1.6.188), when compared to the reference specimen. However, as the poritids are the most poorly preserved specimens, I have not been able to separate these morphs in the time available. The identifying features are: the porous structure of corallum, the number of septa (12), the tabular dissepiments, the overall size and shape of the corallites.

Specimens: Eighty-six specimens collected. Reference specimen: SaQ1: 59 (BMNH no. AZ8669).

Figure 170: *Porites* sp. *2* (branching form) – close up of corallites.

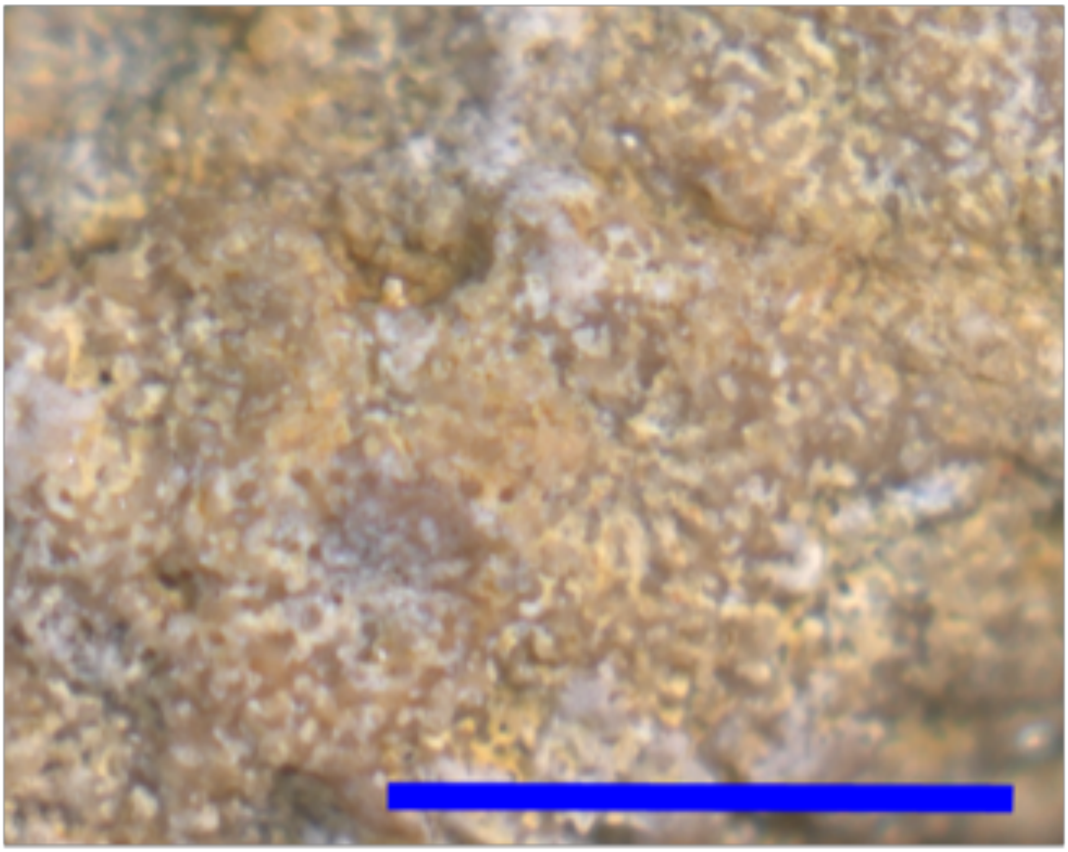
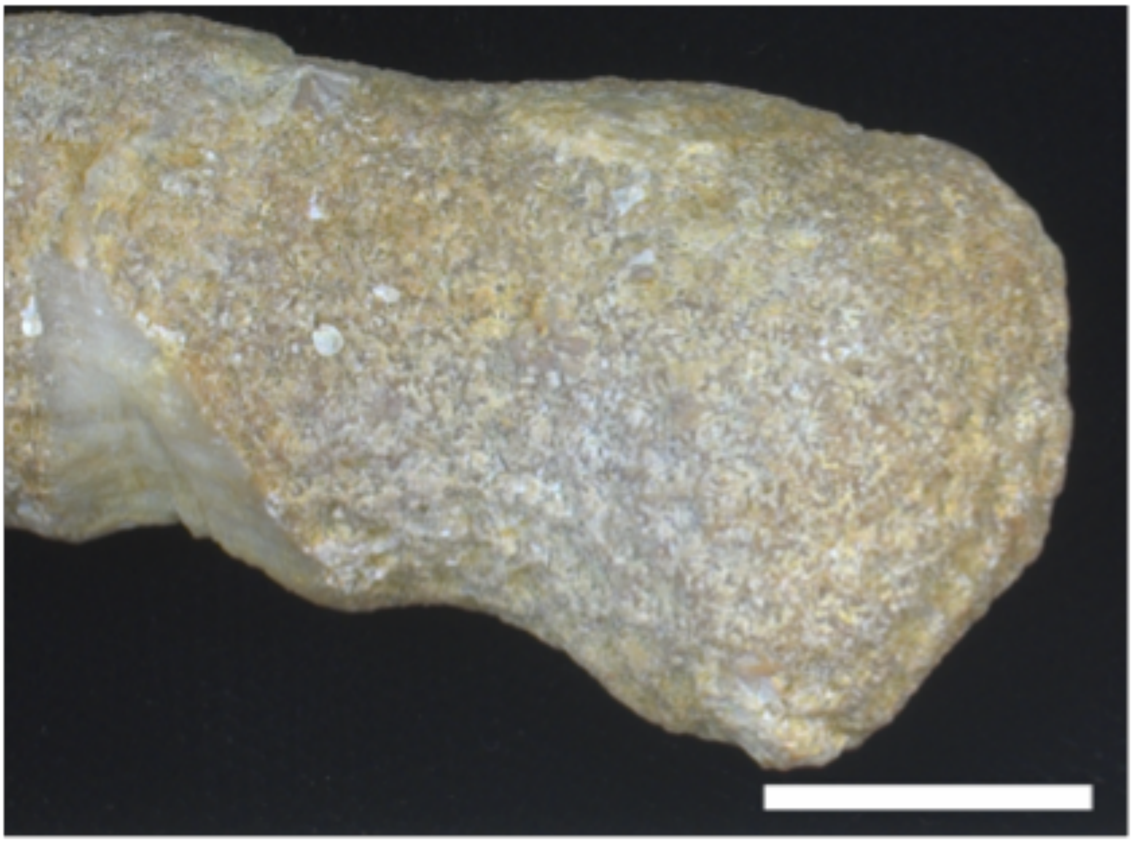


Figure 171: *Porites* sp. *2* (branching form) – branch oral surface.

Figure 172: *Porites sp. 2* (branching form) – branch tip



Scolymia australis (Milne Edwards and Haime, 1849)

(Figs. 173 and 174.)

Identification Reference(s):

Budd and Stolarski, 2009. Fig. 2, pic. K; specimen figured is from the Recent of south Australia (USNM 85709). Veron and Pichon, 1980. pp. 250-252, fig. 425; specimen pictured is a recent species collected from eastern Australian waters. Veron, 2000. Vol. 3, pp. 70-71; specimens photographed here are from the Recent of Australia, Papua New Guinea, Western Pacific and Indonesia.

Description: Solitary, infundibuliform colony form. Columella: spongy. Approximately 50 septa in corallite. Septa: slightly exsert at outer calice wall.

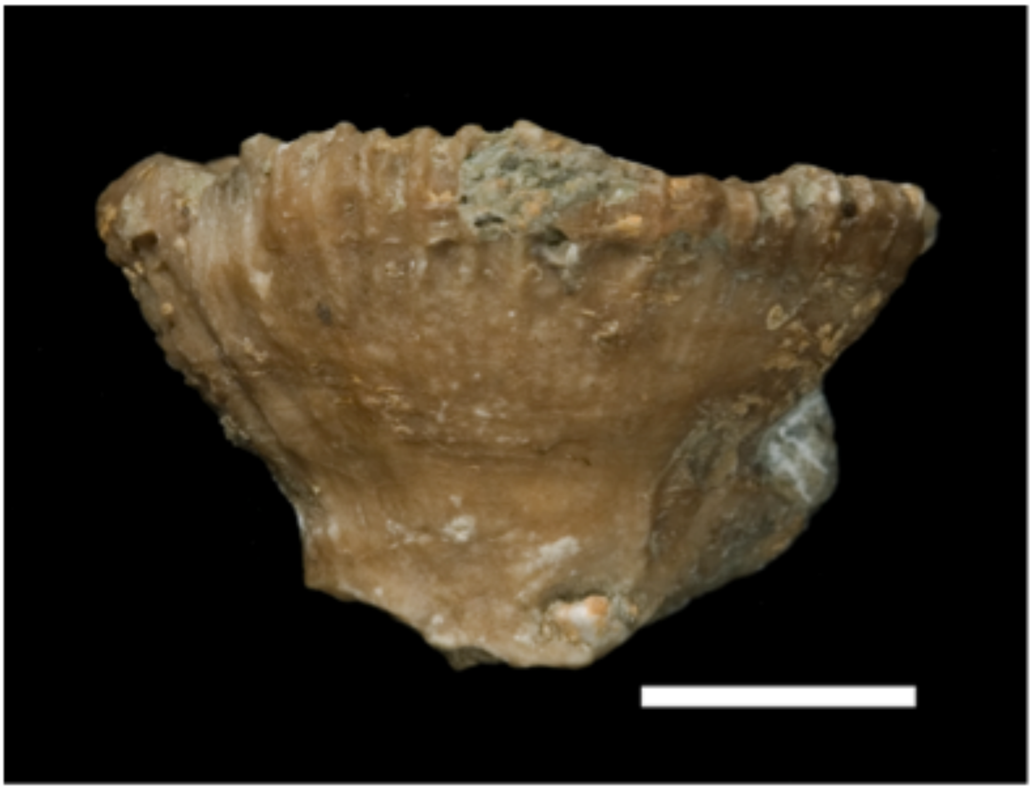
Septal spacing: 0-1 per mm. Three orders of septa: large, small, medium, small, large etc. All septa reach columella. Distal septal margins: uneven, possibly with numerous toothy projections, but these have broken-off. Septal faces: small pointed, conical/spiny projections. Some septa in transverse section slightly zigzag; a spine is present on the corner of each zigzag. Septo-costae: prominent at calice edge, but less pronounced moving down outside of corallum towards attachment site; 0-1 per mm. Calice diameter: 32.7 mm. Stalk diameter: 18.0 mm. Surface thickness (from top of stalk to top of calice wall): 19.0 mm. Extramural budding.

Remarks: I believe this specimen is *Scolymia australis* (in Budd and Stolarski, 2009). All the features are the same as the literature description, including the overall size.

Specimens: One specimen collected, the reference specimen: LSa1: 2037 (BMNH no. AZ8504).

Figure 173: *Scolymia australis* – oral view.

Figure 174: *Scolymia australis* – side view of corallum.



Stylocoeniella guentheri Bassett-Smith, 1890

(Figs. 175 and 176.)

Identification Reference(s):

Veron and Pichon, 1976. pp. 38-41, figs 45-49; specimens pictured are recent species collected from reefs in eastern Australian waters. Scheer and Pillai, 1983. pp. 20-21, Pl. 2, fig. 2; figured specimen is from the Recent from Wingate Reef off Port Sudan, Red Sea (ZMB 7012).(ZMB = Museum für Naturkunde der Humboldt-Universität Berlin, Zoologisches Museum).

Description: Branching/columnar colony form. Colony type: cerio-plocoid, possibly just plocoid? Columella: styliform. Septa: 12 per corallite. Septa: not exsert. Septal spacing: 3-4 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st septal order reach calice centre, 2nd order reach 1/4 - 1/3 towards centre. Distal septal margins: 3 rounded, upward-pointing projections along them. Septal faces poorly preserved, due to sediment infilling. Calice diameters: 0.5-1.3 mm. small columnar projections observed between adjacent calices (where preserved). Corallite spacing: 0.8-2.4 mm. Extramural budding. Coenosteum: granulated/porous. Tabular dissepiments. Branch diameter: 61.8 mm. Branches: always wider in one direction than at 90 degrees to that direction. Growth occurs in layers, edges of layers are visible.

Remarks: This specimen appears the same as *Stylocoeniella guentheri* in Veron and Pichon (1976). It fits the description given in Scheer and Pillai (1983), except that the largest calice diameters range to about 0.2 mm wider in the present specimen than in the species described in the literature. However, this is not a very large difference and attribution to *S. guentheri* is therefore deemed appropriate for this specimen group. The main useful features are: the size of the corallites, the columella type, the number and arrangement of septa, and the inter-corallite pillars.

Specimens: Fourteen specimens collected. Reference specimen: 4.3.1018 (BMNH no. AZ8041).

Figure 175: *Stylocoeniella guentheri* – corallites.

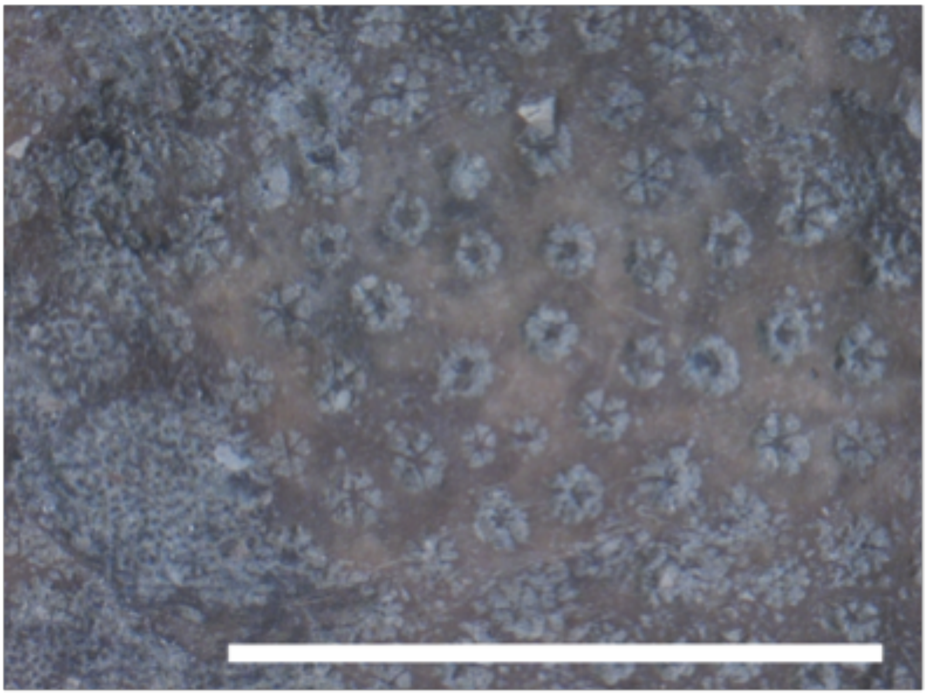
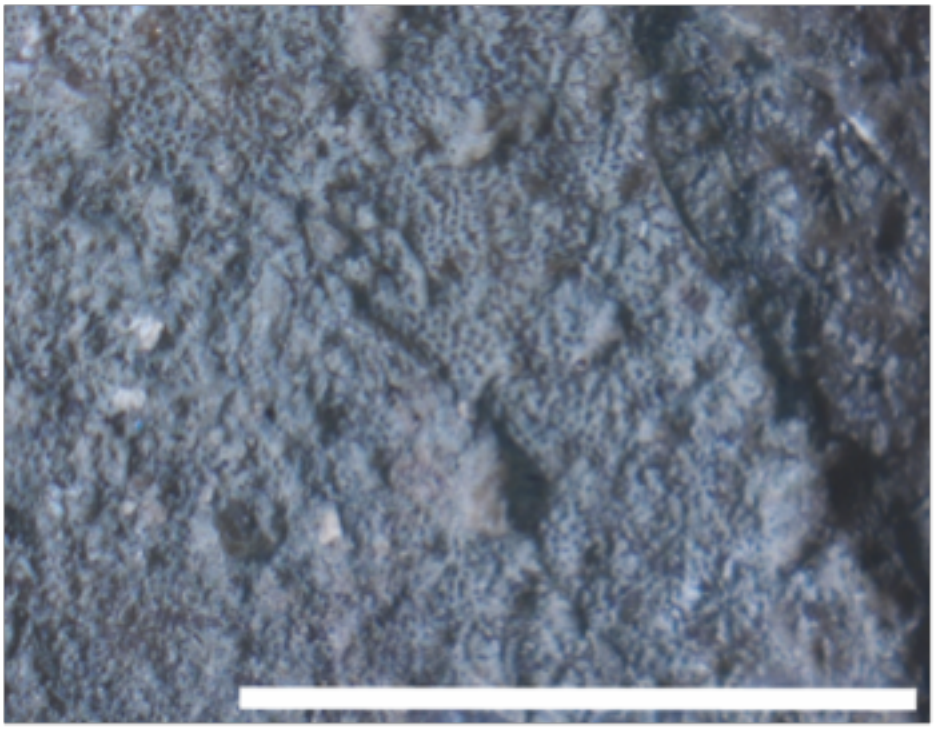


Figure 176: *Stylocoeniella guentheri* – oral surface.



Stylophora aff. *danae* Milne Edwards and Haime, 1850

(Figs. 177 and 178.)

Identification Reference(s):

Veron, 2000, Vol. 2, p. 63; specimens photographed here are from the Recent of the Sinai Peninsula, Egypt.

Description: Thin, platy/encrusting colony form. Colony type: plocoid. Columella: styliform. Septa: 12 per corallite. Septa: not exsert. Septal spacing: 5-6 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order septa reach 2/3 towards calice centre, 2nd order reach 1/3 towards centre. Distal septal margins (where preserved): lumpy, with occasional rounded projections visible. Septal faces: poorly preserved due to sediment filling calice. Calice diameters: 0.7-1.2 mm. Calices: are exsert by approximately 0.3 mm. Corallite spacing: 1.3-3.2 mm. Extramural budding. Coenosteum: slightly porous and covered in "spinules". Cannot see underside as specimen is encrusting a platy coral. Plate thickness: 0.5-2.6 mm.

Remarks: This specimen group has similar corallite form to *Stylophora danae*, but the growth form is completely different: *S. danae* is branching, while this specimen grows in thin, possibly encrusting, plates. I have not been able to find a match to this species in the literature. The useful features for identification are: the very small corallites, there are 12 septa in 2 unequal orders, the spinose/porous coenosteum, the extratentacular budding, and the styliform columella.

Specimens: Seven specimens collected. Reference specimen: 2.1.457 (BMNH no. AZ7784).

Figure 177: *Stylophora* aff. *danae* – close up of corallites.

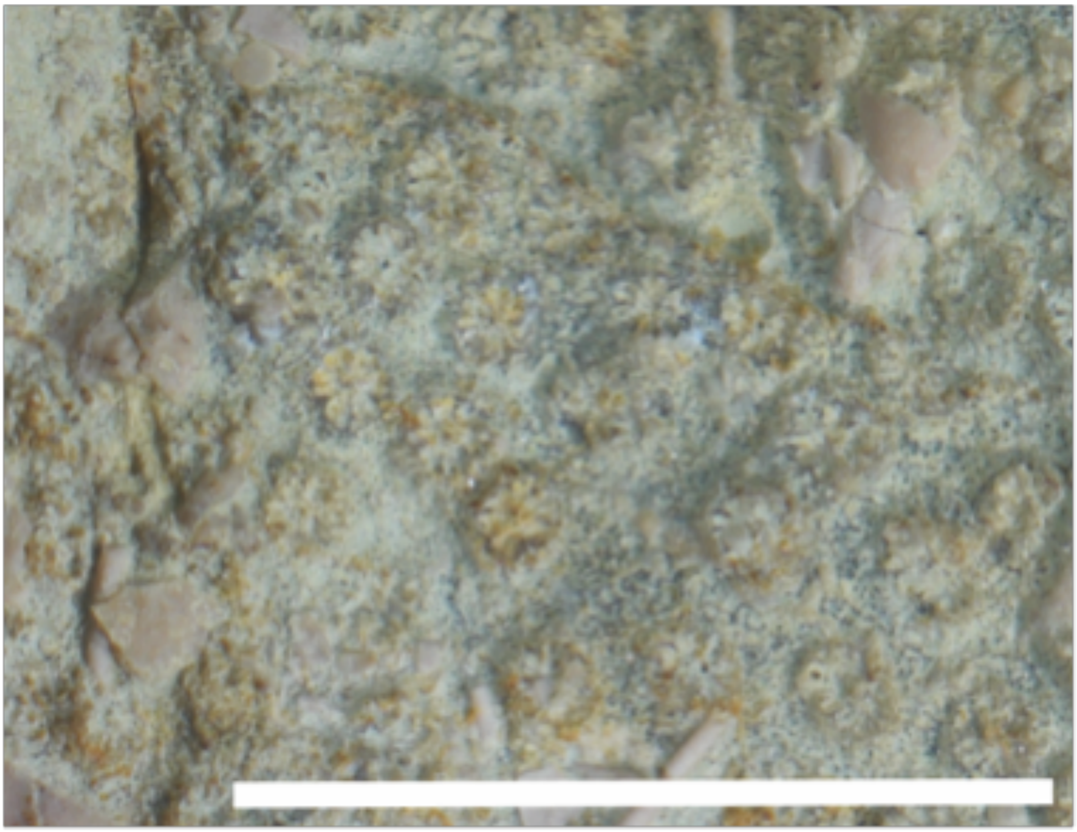
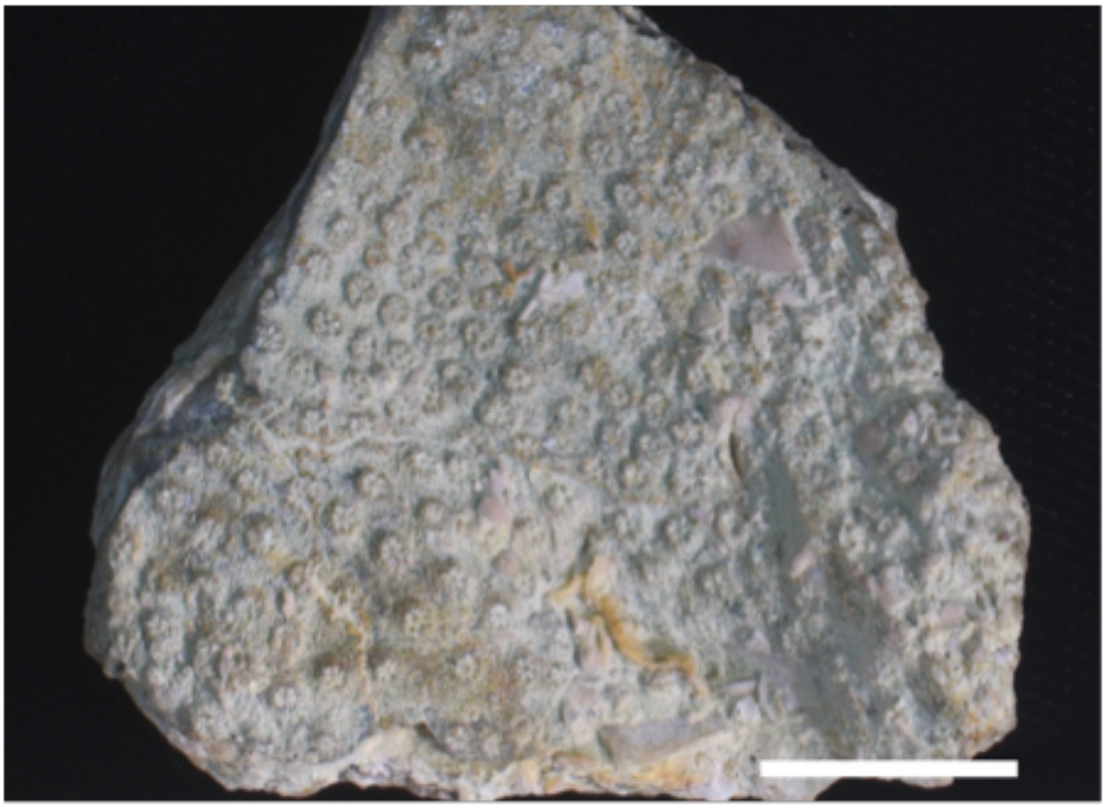


Figure 178: *Stylophora* aff. *danae* – whole specimen, oral surface.



Stylophora pistillata Esper, 1797

(Figs. 179, 180 and 181.)

Identification Reference(s):

Stylophora pistillata: Veron and Pichon, 1976. pp. 66-70, figs. 133-134; specimens pictured are recent species collected from reefs in eastern Australian waters. Veron, 2000. Vol. 2, pp. 58-59; specimens photographed here are from the Recent of Papua New Guinea, Australia and Indonesia.

Stylophora macdonaldi Vaughan, 1919: Vaughan, 1919, p. 339-340, pl. 75, figs. 5-7a; specimens figured are cotypes (USNM 324769 and 324770), collected from the Emperador Limestone, Panama (upper Oligocene). (USNM = United States National Museum).

Description: Branching/columnar/ramose colony form. Colony type: cerioid. Columella: styliform. Septa: 12 per corallite. Septa: not exsert. Septal spacing: 6-7 per mm. Two orders of septa: large, small, large, small etc. Septal lengths: 1st order septa reach columella, 2nd order are almost redundant. Distal septal margins: bumpy/porous structure; 2-4 bumps along each edge. Septal faces: bumps/projections; not easy to observe due to diagenesis. Calice diameters: 0.6-1.1 mm. Corallite spacing: 1.8-2.3 mm. Corallites resemble a diagram of a 6-petalled flower, with gaps between petals marked by 1st order septa. Extramural budding. Coenosteum: slightly porous, covered in "spinules". Tabular dissepiments. Both sides of corallum have corallites. Branch diameter: 20.9-34.7 mm. Platy-part thickness: 16.2-50.6 mm.

Remarks: This specimen is the same as *Stylophora pistillata* in Veron and Pichon (1976), and Veron (2000). It is also very similar to *Stylophora* *macdonaldi* in Vaughan (1919), which may be a synonymy of *S. pistillata*. No calice "hoods" are seen, but the surface preservation of this specimen is not good. Also some of the photos in Veron and Pichon (1976) show corallites without hoods. The features used in attributing this species group to *S. pistillata* are: the columella, the septal arrangement, and the coenosteum type.

Specimens: Thirty-seven specimens collected. Reference specimen: 4.3.1013 (BMNH no. AZ8036).

Figure 179: *Stylophora pistillata* – close up of corallites.

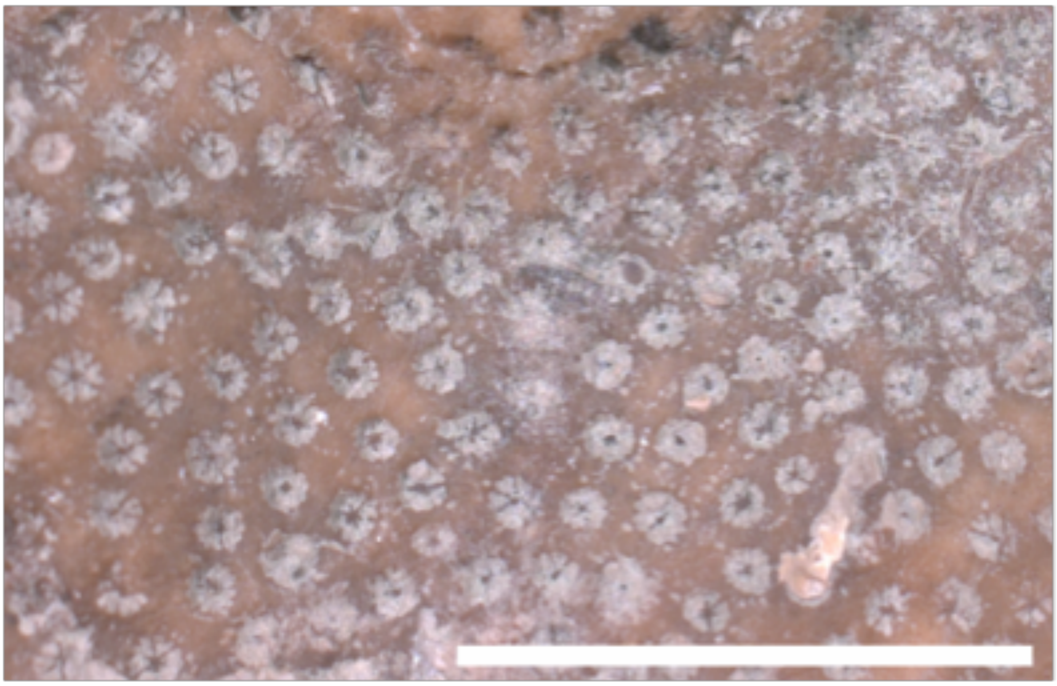


Figure 180: *Stylophora pistillata* – close up of corallites and coenosteum.

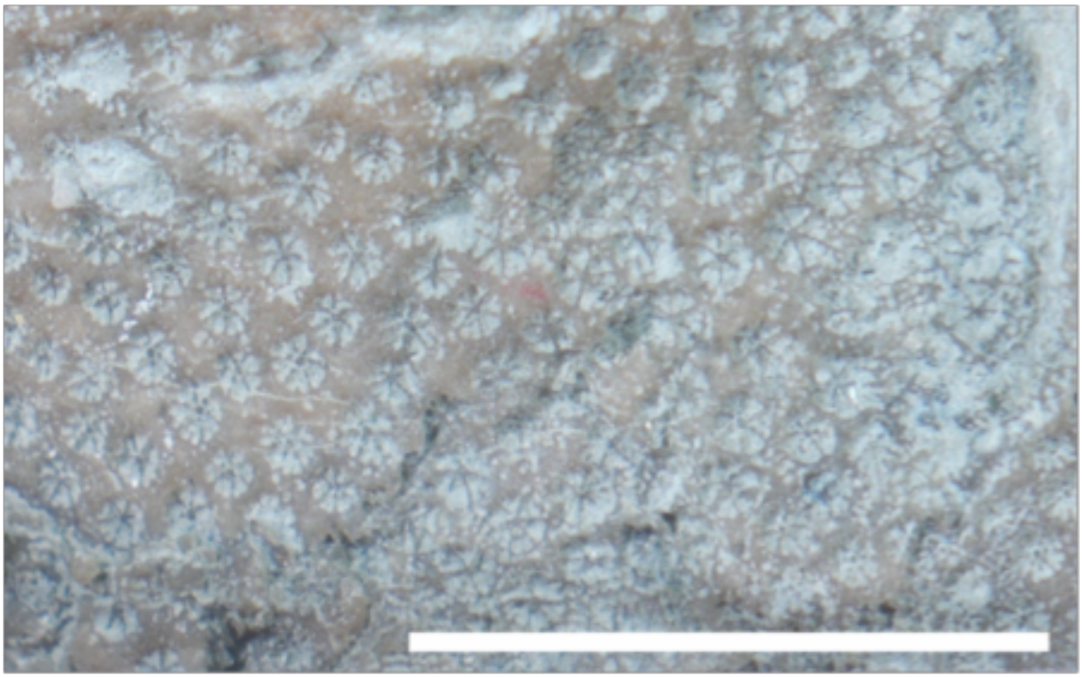
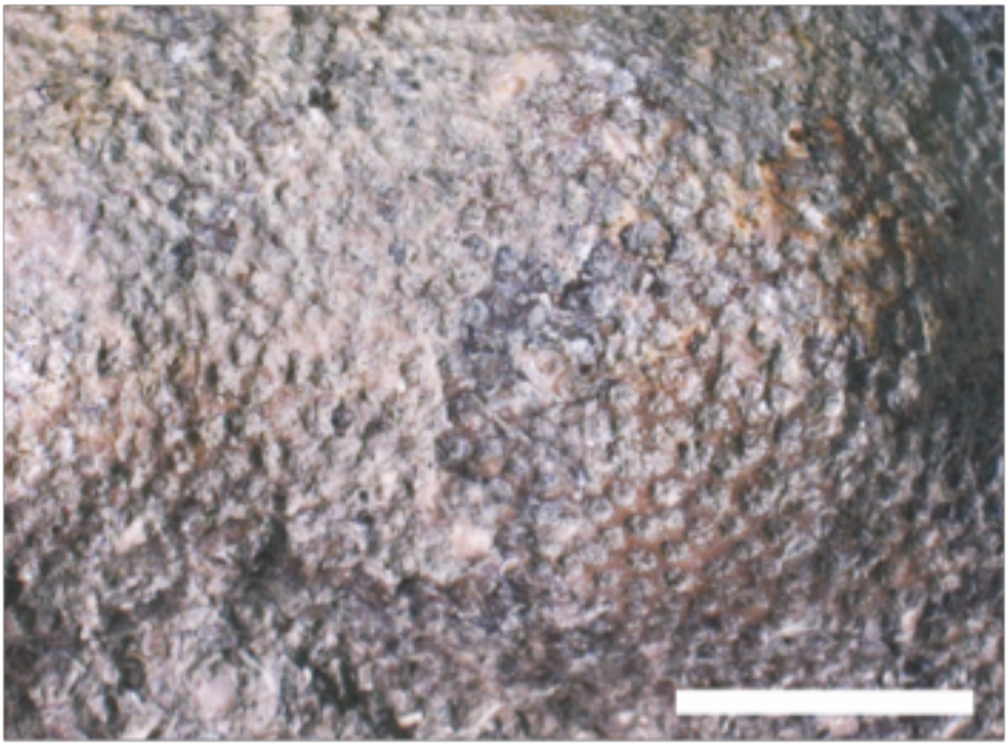


Figure 181: *Stylophora pistillata* – oral surface.



Stylophora aff. *tenuissima* Gerth, 1923

(Figs. 182, 183 and 184.)

Identification Reference(s):

Stylophora tenuissima: Gerth, 1923. p.97, pl. 8, fig 1; Leloux and Renema, 2007. p. 48, pl. 90, figs. 12-14; figured specimens are the syntypes from the Upper Miocene of Kalimantan Timur, Indonesia (specimen nos. RGM 167793, 167794 and 167795).

Genus reference: *Stylophora*: Wells, 1956, p. F372.

Description: Branching/ramose colony form. Colony type: plocoid. Columella: styliform. Septa: 6-12 per corallite; possible second smaller order of septa between 6 larger ones, but feature poorly preserved. Septa: not exsert. Septal spacing: 5-6 per mm. ?Two septal orders: large, small, large, small etc. All septa reach columella. Distal septal margins: poorly preserved. Septal faces: poorly preserved due to sediment infilling calice. Calice diameters: approximately 0.6 mm. Calices: in spiral arrangement around branches. Corallite spacing: 0.9-3.8 mm. ?Extramural budding. Coenosteum: granulated/porous. Calices: exsert to ≤1.2 mm above coenosteum. Septo-costae: 6-8 per mm. Septo-costae: are lined-up spines, which extend down outside of exsert part of calice wall. Branch diameters: 3.9-8.8 mm. Possible axial corallite present extending down centres of branches (feature poorly preserved).

Remarks: The reference specimen matches the description for the genus *Stylophora* in Wells (1956), as the calices spiral irregularly around the branches (rather than being in lines along the branches as in the related genus *Seriatopora*). This specimen most closely resembles *Stylophora tenuissima* (in

Gerth, 1923 and Leloux and Renema, 2007), except this specimen has exsert calices and thinner branches. This species also bears a superficial, morphological similarity to both *Acropora reticulata* (Brook, 1893) and *Seriatopora micrommata* Felix, 1921; there appears to be convergent evolution of form between these three species. The features most useful for identification are: the septal number and arrangement, the styliform columella, the calice arrangement around branches, the size of the calices, and the porous skeletal structure.

Specimens: Twenty-five specimens found. Reference specimen: PP1: 401 a (ii) (BMNH no. AZ8618).

Figure 182: *Stylophora* aff. *tenuissima* – close up of corallites.

Figure 183: *Stylophora* aff. *tenuissima* – close up of corallites, side view.

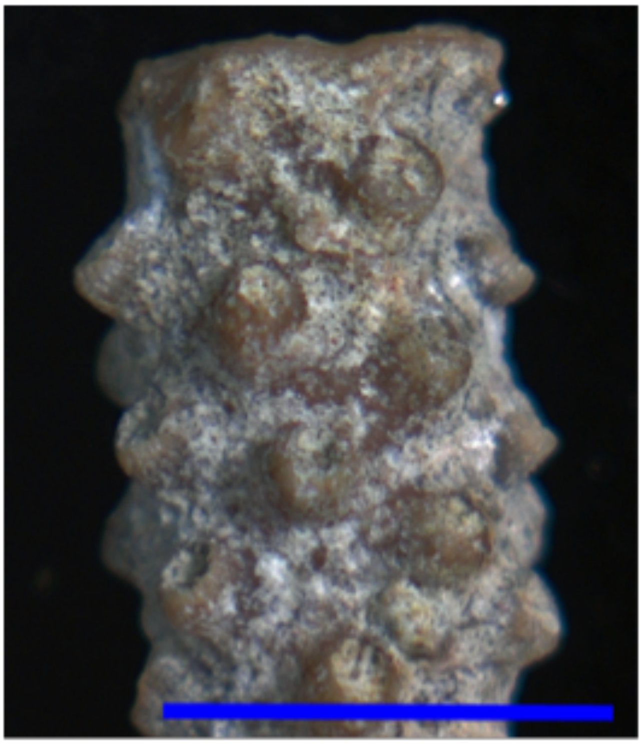


Figure 184: *Stylophora* aff. *tenuissima* – whole specimens.

Trochoseris aff. *florescens* Felix, 1921

(Figs. 185 and 186.)

Identification Reference(s):

Trochoseris florescens: Gerth, 1923. p. 103, Pl. 8, fig. 8 specimen from the Miocene of Borneo; Leloux and Renema, 2007. p.49, pl. 94 figs. 6-8; figured specimen from the Miocene of Kabasian River, Kalimantan Timur, Indonesia (specimen no. RGM 17710).

Trochoseris semiplanus: BMNH R22257: holotype from the Upper Eocene of Polje von Lukavac nr. Nevesinje, Herzegowina.

Trochoseris genus description: Wells, 1956. p. F381.

Description: Solitary, patellate and stalked colony form. Has overall shape of a flower with all petals fused together; alternatively, is infundibuliform (funnel-shaped), with slightly lobed-edges. Columella: not visible. Numerous (>50) septa present. Septal spacing: 2-3 septa per mm (around outer edge). Septa: slightly exsert. 5 septal orders: L, T, v.S, T, S, T, v.S, T, M, T, v.S, T, S, T, v.S, T, L etc. (see section 3.3.1 for explanation of abbreviations). Septal lengths: 1st and 2nd orders reach calice centre, 3rd order reach 3/4 to centre, 4th order reach approximately 1/3 towards centre, 5th order septa reach halfway towards centre. Distal septal margins: slightly uneven. Septal faces: covered in small slightly pointed bumps/granules. Septal projections: very spiky/pointed when viewed from above oral surface. 1st order septa are thicker than following orders. Septal projections: wider in diameter in transverse view, than in longitudinal axis. Septal projections: cone-shaped, and point out at 90° to septal face. Calice diameter: approximately 55 mm; measurement estimated, as specimen is broken around edges. Budding type not observed. Underside of corallum: striated; 2-3 septo-costae per mm. Stalk diameter: 14.4 mm. Main surface (the part of the coral that is not the stalk) thickness: 1.5-3.1 mm.

Remarks: I have compared this reference specimen to the specimens illustrated in the Gerth Collection (in Gerth, 1923 and Leloux and Renema, 2007), and believe it to belong in the genus *Trochoseris* as it better fits the description of the genus *Trochoseris* given in Wells (1956), than that of *Lithophyllon*, a closely related genus also in the latter reference. This specimen is not as large as the BMNH holotype of *T. semiplanus*, and has fewer and somewhat thicker septa. It also has longer thickened areas on the septa near the centre of the calice when compared to *T. semiplanus*, and the septa appear slightly more exsert on the present specimen. It is hard to tell if this is in fact the same species as *T. florescens* in Gerth, and comparison to the type specimen would be useful in discerning the relationship. This specimen is superficially similar to *Lithophyllon lobata* in Veron (2000) and *Lithophyllia explanata* Gerth, 1921 (seen in Gerth 1921). The features used here for identification are that the specimen is solitary and attached, it is infundibuliform, it has numerous septa, the septal faces are covered in granulations, it has a weak/no columella, it has costae on the underside and it does not have dissepiments.

Specimens: Four specimens collected. Reference specimen is LSa: 209 (BMNH no. AZ8495).

Figure 185: *Trochoseris* aff. *florescens* – oral view.

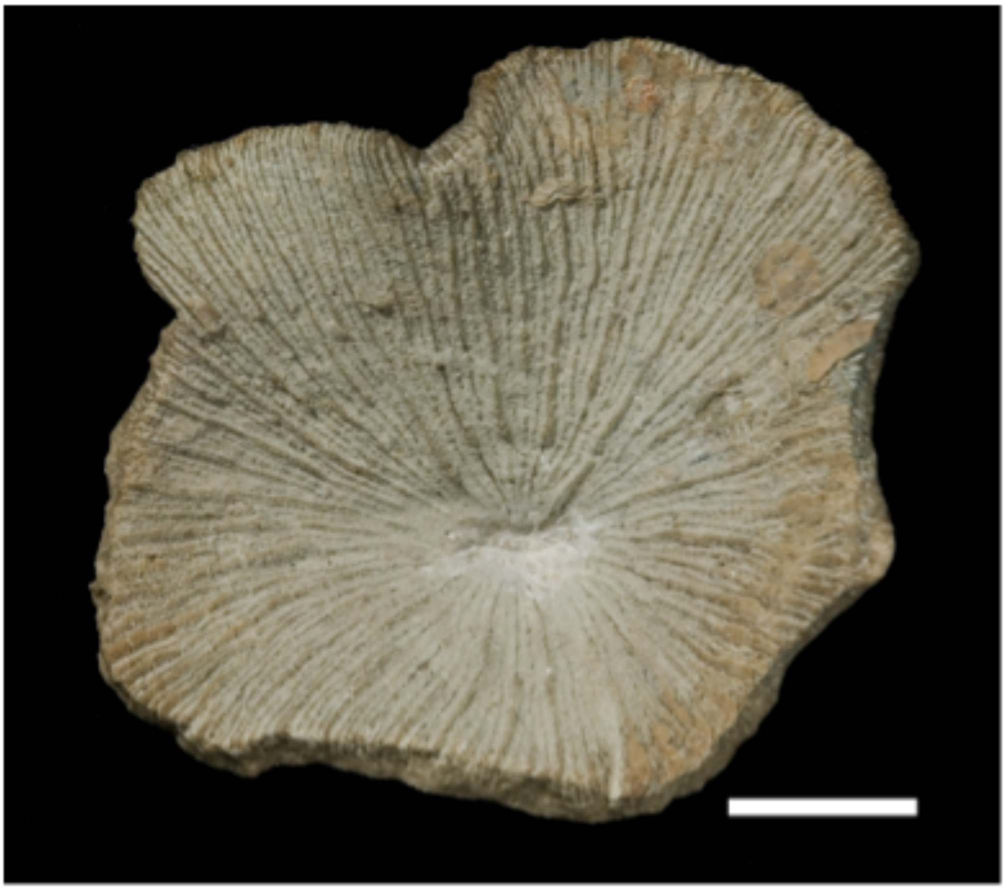
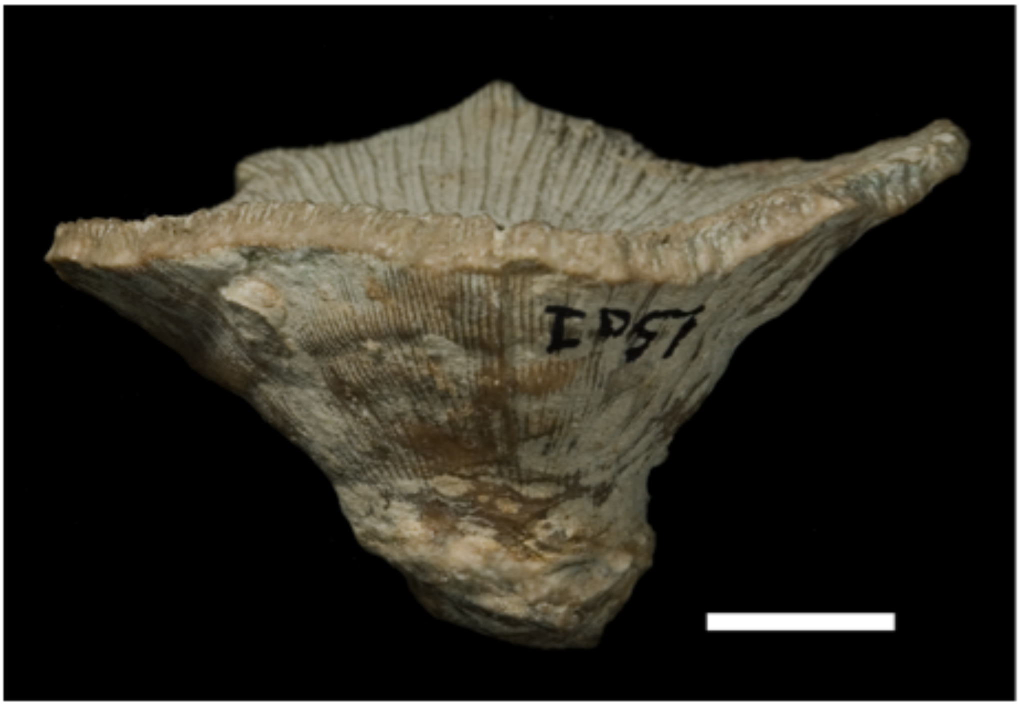


Figure 186: *Trochoseris* aff. *florescens* – side view of corallum.



Turbinaria aff. *irregularis* Bernard, 1896

(Figs. 187 and 188.)

Identification reference(s):

Turbinaria irregularis: Veron, 2000. Vol. 2, pp. 398-399; specimens photographed here are from the Recent of Papua New Guinea, Philippines, Japan and Guam.

Turbinaria peltata: Latypov, 1994. Veron, 2000. p. 390; specimens photographed here are from the Recent of Australia and Papua New Guinea.

Description: Platy colony form. Colony type: plocoid. Columella: spongy. Septa: 24 per corallite. Septa: not exsert. Septal spacing: 6-7 septa per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st order reaches 2/3 towards centre, 2nd order reaches 1/4 towards centre, 3rd order is almost redundant. Distal septal margins: slightly uneven, but cannot see them very well due to diagenesis. Septal faces: smooth, but hard to tell for certain as only small sections are preserved. Calice diameters: 0.8-2.0 mm. Calices: located at tops of conical mounds. Corallite mound heights: 0.5-3.7 mm. Corallite spacing: 1.5-8.3 mm. Corallites: slightly unevenly sized and spaced. Extramural budding. Septo-costae: present; 5-6 per mm. Septo-costae extend down outer wall of corallite, and terminate at coenosteum. Coenosteum: slightly spiny (v. small spines). No dissepiments observed. Underside of corallum: rough and lumpy. Plate thickness: 4.9-36.6 mm. Corallum: unevenly undulating growth form.

Remarks: The reference specimen appears similar to *T. irregularis* of the present day, but the corallites are circular rather than oval (in *T. irregularis*), and the septa appear to have a different layout. The specimen fits into the description of *T. peltata* in Latypov (1994), and also has the same uneven distribution of corallites as *T. peltata* in Veron (2000), however the corallite mounds appear to protrude further in the reference specimen, and the corallites are 1/3 of the size, therefore I am attributing this group to open nomenclature with an affinity to *T. irregularis* (Veron, 2000), with which it appears to share more characters.

Specimens: Twenty-four specimens collected. Reference specimen: PO: 410 (BMNH no. AZ8560).

Figure 187: *Turbinaria* aff. *irregularis* – close up of corallites.

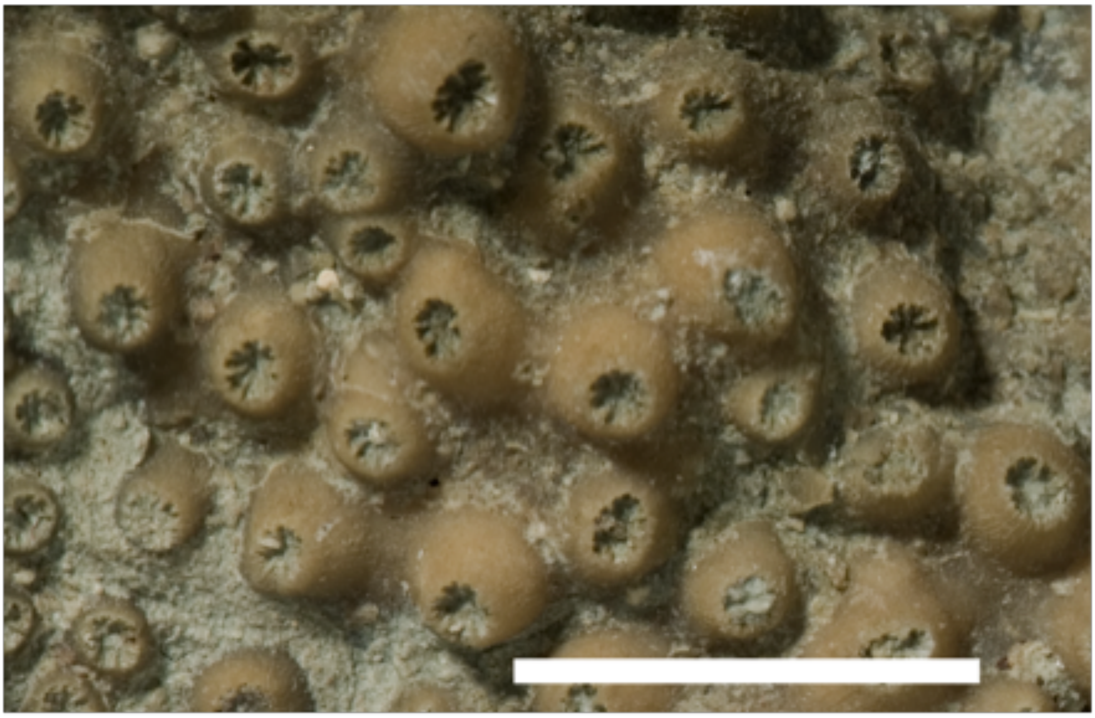
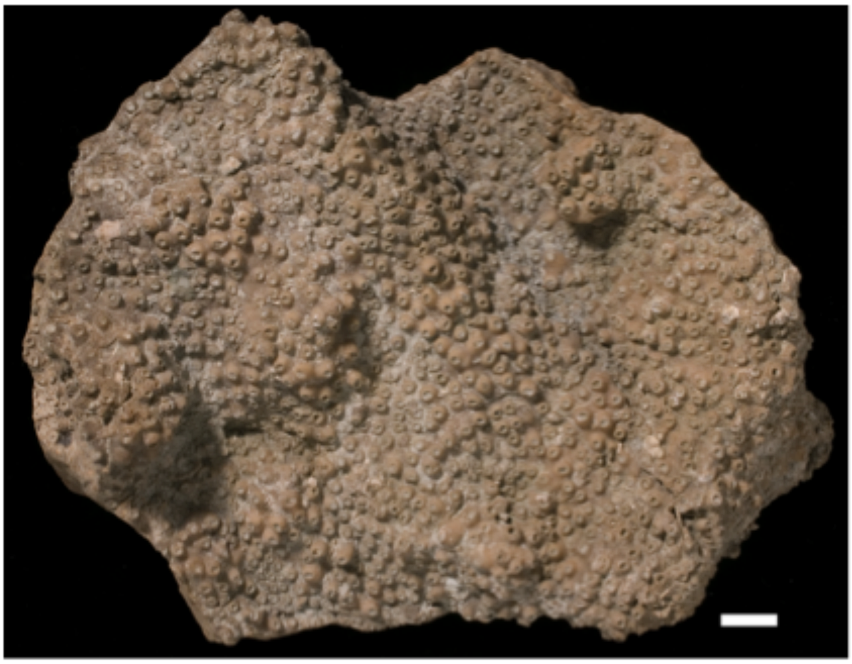


Figure 188: *Turbinaria* aff. *irregularis* – whole specimen.



Turbinaria aff. *reniformis* Bernard, 1896

(Figs. 189 and 190.)

Identification Reference(s):

Veron and Pichon, 1980. p. 391-395, fig. 698; figured specimen is from the Recent of the Swain Reefs in eastern Australia. Veron, 2000, Vol. 2, p. 396; specimens photographed here are from the Recent of Australia, Japan, Egypt and the Western Pacific.

Description: Platy colony form. Colony type: plocoid. Columella: styliform, (feature poorly preserved, detail has been lost through re-crystallisation). Septa: 7-16 per corallite (feature poorly preserved). Septa: not exsert. Septal spacing: 4-5 septa per mm. Three orders of septa: large, small, medium, small, large etc. Septal lengths: 1st septal order reaches columella, 2nd order reach 2/3 towards columella, 3rd order reach 1/3 towards columella. Distal septal margins: uneven and bumpy. Septal faces: poorly preserved due to sediment infilling calices. Calice diameters: 0.9-1.4 mm. Calices: located at tops of conical mounds. Calices: slightly offset to one side of mounds rather than directly in centre, at top. All the calices are offset in same direction. All corallite mounds touch adjacent mounds at bases; very little flat coenosteum visible. Corallite mounds: quite unevenly distributed (rather than uniformly); some are very close to adjacent corallites, so the mounds merge together; others are more separated from adjacent mounds. Corallite spacing: 3.0-12.4 mm. Extramural budding. Coenosteum: porous. Underside of corallum: smooth but uneven; mainly covered by encrusters. Plate thickness: 4.0-7.8 mm.

Remarks: I could not find a species that resembles this specimen group in the fossil literature, so I have allied it with *Turbinaria reniformis* (in Veron and Pichon, 1980). It looks most similar to the specimen in fig. 698 on p. 394 in the latter reference, although Veron and Pichon (1980) state that *T. reniformis* has just 2 cycles of septa that are either equal or sub-equal, whereas this specimen has 3 orders of septa that are obviously distinguishable from one another. I would like to compare this species group to the type specimen of *T. reniformis* to be certain of this attribution, as the two species are very far apart in age, and convergent evolution of form cannot be ruled out.

Specimens: Fifteen specimens collected. Reference specimen: 2.1.411 (BMNH no. AZ7752).

Figure 189: *Turbinaria* aff. *reniformis* – close up of corallite.

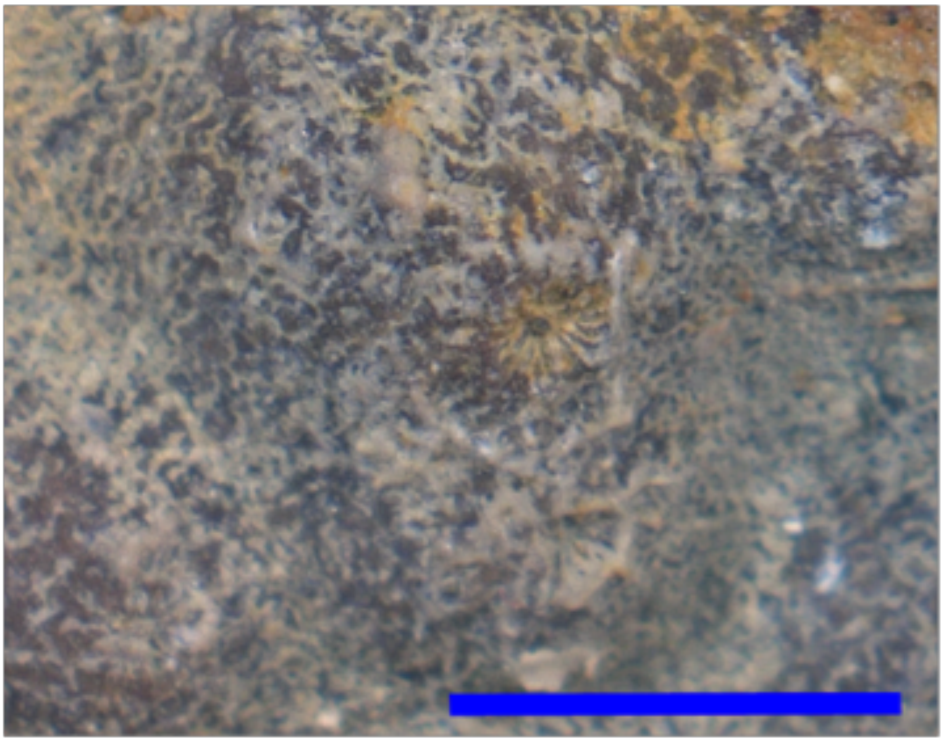
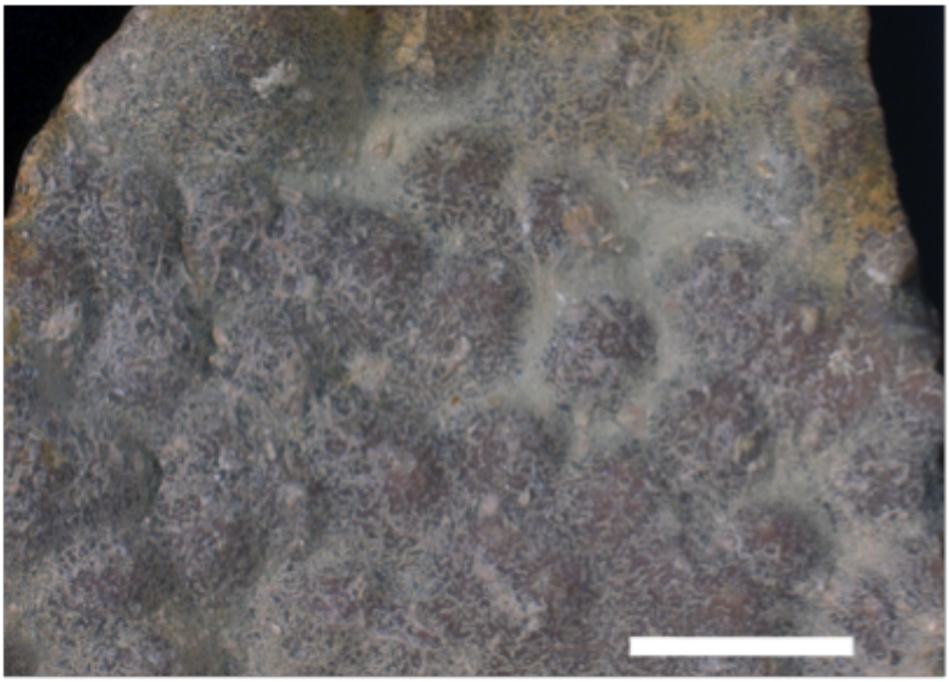


Figure 190: *Turbinaria* aff. *reniformis* – oral surface.



Turbinaria tenuis Marenzeller, 1908

(Figs. 191 and 192.)

Identification Reference(s):

Turbinaria tenuis: Gerth, 1923. p. 123, pl. 7, fig. 12; pictured specimen from the Miocene of Borneo. Leloux and Renema, 2007. p. 49, pl. 95, fig. 12; figured specimens from the Miocene of Kabasian River, Kalimantan Timur, Indonesia (specimen no. RGM43001).

Turbinaria mesentaria (Lamarck, 1816): Veron, 2000, Vol. 2, p. 394; specimens photographed here are from the Recent of Australia, Japan, Indonesia and Papua New Guinea. Veron and Pichon, 1980. pp. 386-391, figs. 678-693; figured specimens are from Recent reefs of eastern Australia.

Description: Thin, platy colony form. Colony type: plocoid. Columella: spongy. Septa: 18-20 per corallite. Septa: not exsert. Septal spacing: 5-6 per mm. Three septal orders: large, small, medium, small, large etc. All orders reach between 1/2 - 1/3 towards the centre. Distal septal margins: smooth/slightly uneven (feature poorly preserved). Septal faces: smooth, but only small sections are preserved. Calice diameters: 1.3-1.4 mm. Calices: located at tops of conical mounds. Corallite mounds: raised more on one side than other; calice tilted at a 45° angle to coenosteum. Mound heights: 1-2 mm. Corallite spacing: 2.6-7.8 mm. Extramural budding. Coenosteum: rough surface; has a "wrinkled" texture. Possible tabular dissepiments (feature poorly preserved). Underside of corallum: smooth with occasional growth lines. Plate thickness: 1.8-4.0 mm.

Remarks: This specimen group is identical to the species of *T. tenuis* in Gerth (1923) and Leloux and Renema (2007). Given the close age of the Gerth specimens to the one collected here, I am confident of this species attribution. The group also bears a similarity to *Turbinaria mesentaria* of the present-day (in Veron, 2000), however the corallites are more widely spaced, and slightly less exsert in the present species. This specimen also has smaller calice diameters than *T. mesentaria*, however it is possible that these are the same species, and that *T. tenuis* is the direct ancestor to *T. mesentaria*. Given the general similarity of form, *T. mesentaria* may be a good ecological analogue for *T. tenuis*. I also believe that *T. tenuis* as identified here, is the same species as *Turbinaria cf. sitaensis* Duncan, 1880 in Schuster, 2002.

Specimens: Thirty-three specimens collected. Reference specimen: LSa1: 208 (BMNH no. AZ8509).

Figure 191: *Turbinaria tenuis* – close up of corallites.

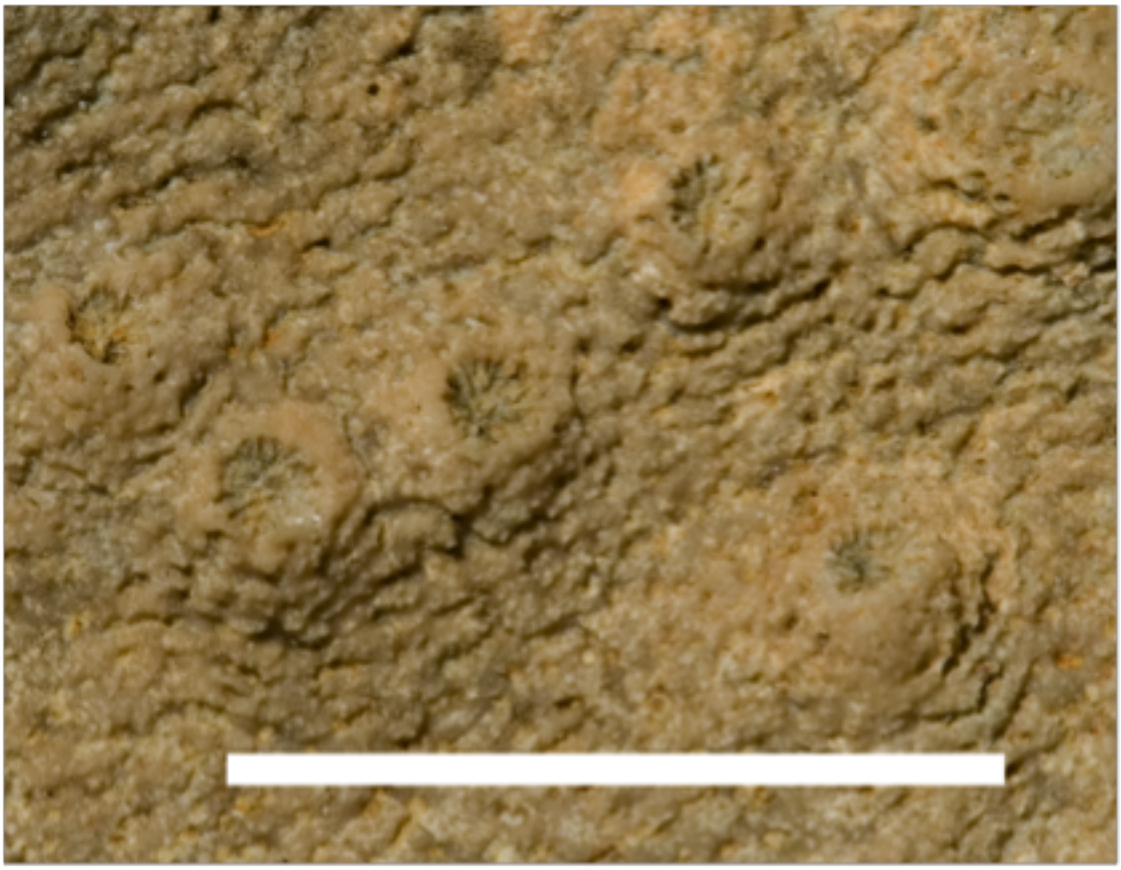
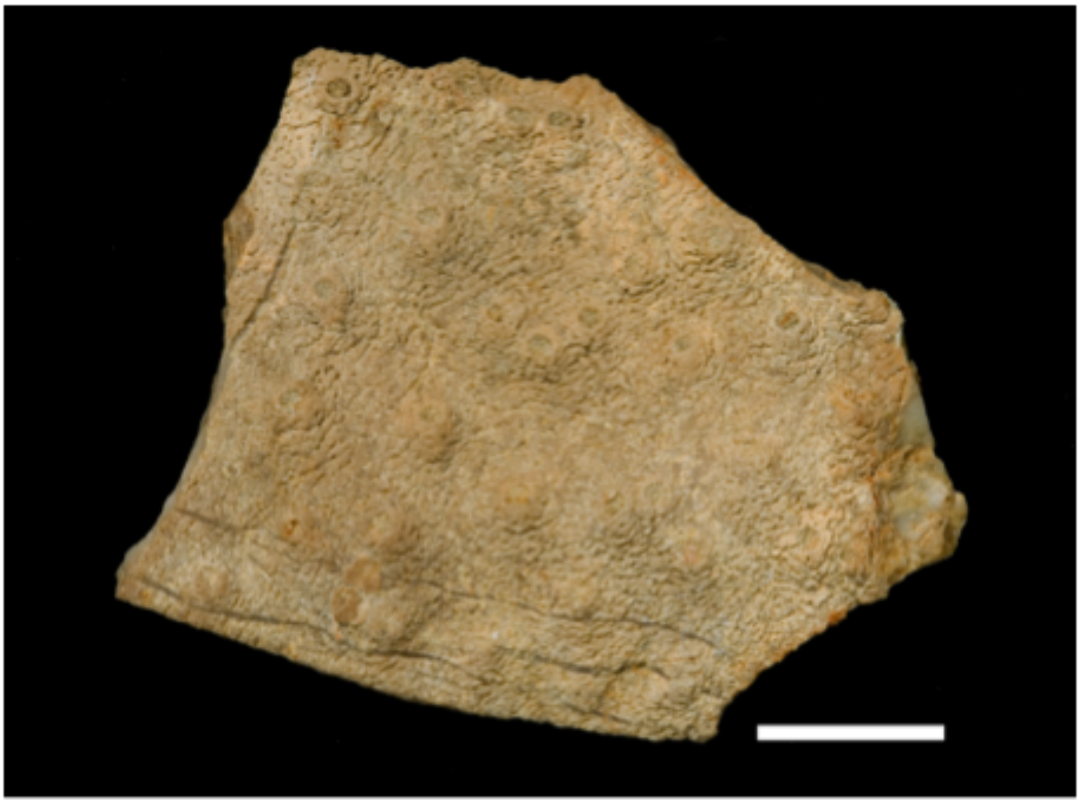


Figure 192: *Turbinaria tenuis* – whole specimen.



3.5 Discussion and Conclusions:

This study has yielded 48 genera consisting of 74 described species from the study area, making it the most diverse collection of fossil corals from the Oligocene of Borneo to date. There are a maximum of 36 species that have not been found in the studied literature. These may be new, but extinct species, however further study is required to confirm this for certain. The numbers of specimens collected for each of the species groups identified range from 1 to 185. There are 20 species in this work that are represented by only 1 specimen. Nine of these are from Sanctuary Quarry, which indicates that more sampling at this locality would be useful, in order to gain more specimens of these species, and therefore give more weight to these groupings. The most numerous (>50) specimen groups in regard to specimens collected are: *Porites* (185 specimens), *Pachyseris* (162), *Lophelia* (133 specimens), *Stylophora* (128 specimens), *Leptoseris* (123 specimens), *Oulophyllia* (116 specimens) *Hydnophora* (91 specimens), *Actinacis* (84 specimens). These numbers of specimens collected reflect the overall area that these species occupied at the exposed localities. Therefore, it can be said that they are the most common species from the study area. They are a mixture of branching and platy coral growth forms, but not encrusting, solitary or massive. The genera found here resemble those found in Dikou and Van Woesik (2006) in their study on corals under sediment stress around Singapore, so it is possible that environmental conditions were similar, but further analysis is needed to confirm this observation.

The most poorly preserved corals have tended to be those with porous skeletal structures. I am not confident that my groupings for the genera *Porites*, *Actinacis* and *Goniopora* are entirely correct, as their poor preservation makes some of the specimens difficult to classify. However time constraints have meant that I cannot try to sort them any further. In order to tell if these taxa have persisted through time, comparisons to collections from later time periods will be needed, i.e. evolutionary series will need to be compiled. It is possible that these corals only resemble their modern-day counterparts, but further work is needed to confirm or refute this. These corals will also require further study and comparison to the relevant type specimens before the taxonomic identifications are as accurate as they can possibly be, however achieving this is outside of the scope of this MPhil project. More time, and further funding for either travel to institutions that hold the type specimens or payment of postage to get type specimens sent over, would be required.

In undertaking this work it has become clear to me that better taxonomic references are needed for corals, especially ones that relate fossil taxonomy to recent taxonomy, as I have found much apparent disagreement in the references I have studied. The best reference available for fossil corals is still the Treatise on Invertebrate Palaeontology Part F (Wells, 1956), however this is now seriously out of date given the many taxonomic revisions that have occurred in the last 50 years.

The most comprehensive reference for modern coral taxonomy is Corals of the World (Veron, 2000), however this is plagued by a lack of useful taxonomic information, with only cursory descriptions of the corals depicted; and also by inclusion of many photographs without a scale reference, and a lack of pictures showing the important taxonomic features for each species. I have not been able to view a copy of the accompanying systematic work, which contains write-ups of all the new species mentioned within the book (even after trying to contact the author by e-mail), however I doubt this has more detail on the previously discovered species, which is sorely needed in this book. References to identification works are given, but it would have been more useful if the main distinguishing features and measurements were given along with the photographs. Taxonomic databases for public use are being compiled on at least 2 websites: Corallosphere (hosted by the Natural History Museum, London) and the Australian Institute of Marine Science's: Corals of the World *online*. Both of these sites are still under-construction, and thus have been of limited use.

It is important that these identifications have been made, as the information gained may be able to shed light on the origins of the present day biodiversity hotspot. As well as providing information on the residence time of various coral species and genera within the IWP, and therefore adding to the evidence about how the area became a biodiversity hotspot, this data can be used alongside data from other coral-rich areas of the world, in order to assess whether any patterns in evolution occur within coral reefs as a whole, which could be useful when directing present-day conservation practices, given the endangered status of many of today's reefs.

Chapter 4:

Diversity of Late Oligocene Corals of SE Asia

Chapter 4: Diversity of Late Oligocene Corals of SE Asia

4.1 Introduction:

As detailed in Chapter 1, one aim of this work is to understand the origins of the Indo-West Pacific Centre of Marine Biodiversity (IWPCMB). IWPCMB is used as shorthand in the following chapter for the geographical area of the world, in which the highest coral biodiversity is located in the present day (the area is illustrated in Chapter 1, figure 1 and Chapter 2, figure 1). It has been shown in the previous two chapters that a taxonomically diverse collection of reef-corals has been collected from Borneo (see Chapter 3), and that these corals were deposited during the Late Oligocene (McMonagle *et. al.*, 2011), making it the earliest, highly diverse collection of reef corals from the IWPCMB region.

Sabah (NE Borneo) has been located within the area of the present-day centre of marine biodiversity throughout most of the Cenozoic (Hall *et. al.*, 2008 for location of Sabah; Hoeksema, 2007 for location of IWPCMB), and is an area of extensive Oligocene and Early Miocene carbonate outcrops, where coral and reef-associated fossils can be found (Noad, 1998; 2001). Even though these can be used to study of the origins and evolution of the present-day IWPCMB, they have not yet been studied or described in much detail. Palaeontologically, the coral fauna is also important because few pre-Miocene fossil corals have been detailed from this region (Wilson & Rosen, 1998; Renema *et al.*, 2008).

In the following work, corals identified at genus-level are used as proxy organisms to assess the biodiversity present in the IWPCMB region during the Late Oligocene. Information on the corals' taxonomy (from Chapter 3), ecology, biology, geographical distribution and whether they are found in the present-day, will be used to ascertain: 1. Are there significant between-exposure differences in diversity and ecology of the corals found within the study area? 2. How does the diversity and composition of this fauna compare with assemblages from other Late Cenozoic faunas of the IWPCMB? 3. How does the generic diversity of these assemblages compare with the diversity of Cenozoic assemblages from the Caribbean and Mediterranean? A discussion of the findings, and the implications for the origins of the IWPCMB will be given.

4.2 Methods:

The ages of sampled exposures have been determined using a combination of nannofossils, larger benthic foraminifera, and strontium isotopes (Chapter 2 in this work, or McMonagle *et al.*, 2011), and the reef corals were identified confidently to genus-level in Chapter 3 (section 3.2). Extinction of a genus has been presumed if the genus is not reported as present in the region in Cairns *et al.* (2007) (the World Register of Marine Species). Each extant taxon has been classified as zooxanthellate (z) or azooxanthellate (az), and following Rosen & Turnsek (1989), I have applied the concepts of zooxanthellate-like (z-like) and azooxanthellate-like (az-like) for extinct taxa based on their affinities to closely related extant taxa.

The faunules studied in this work are the exposures collected from, and these exposures are separated by stratigraphic interval and/or geographic location, and range from a few metres to about ten metres (see Appendix 1 for locality photos). Timed-count specimen collection was the best sampling method that could be used consistently at all sites, since bedding orientation varied hugely between exposures (from near vertical to near horizontal) whilst some even lacked obvious bedding, and transects could not be safely performed. Timed collections were used to estimate abundance of taxa at selected sites, by collecting from the exposure for a set of 10-minute time intervals and placing the specimens found during each time interval into a labelled bag for future identification. The specimens collected during each 10-minute interval equal one sample. Each set of timed-count samples were stopped when no new species were found for 20 minutes or more (these “no-species” samples are not included in the results), or when the entire surface of the exposure had been collected from and the corals collected appeared to not be new species (although this was often hard to discern, as at most sites the corals were covered in a silty-mud that obscured much of the surface detail).

Random samples (collections of specimens) were also taken, and are collections that appeared interesting (from a given exposure), but no set collection parameters were used (i.e. the time spent collecting for these samples was not standardised). The main difference between a timed sample and a random sample is that while random sampling may give a better estimate of overall taxonomic richness (i.e. more rare specimens will be collected), timed count sampling should give better estimates of abundance and therefore diversity. Random and timed samples cannot be directly compared to one another because of this difference in the sampling methodology. The specimens found at LQ were cleaned and identified as morpho-species in the field, since there was a water source present on site. All specimens that did not appear to be corals were removed from the timed samples. At the other exposures specimens were bagged, and cleaned later, but all the collected specimens were kept.

The raw data tables for these analyses can be seen in Appendix 2 (at the end of this thesis). For the present analysis, all taxa identified to the level of genus were used, including some species-groups of solitary corals that were not included in the previous chapter's systematic identifications, due to the time constraints on this work. Generic-level diversity has been chosen for this analysis, both due to variable preservation of some of the assemblages and that a rigorous species-level taxonomic framework does not exist for the studied assemblages, and development of such a framework is beyond the scope of this study. Comparison data were obtained for SE Asian sites based on collections at NCB Naturalis and NHM London (Leloux and Renema, 2007; Johnson *unpub. data*), and Caribbean data were obtained from a specimen-based compilation of reef-coral occurrences developed by A.F. Budd, K.G. Johnson and others (Budd. 2000; Johnson *et al.,* 2008 and others). All analysis of the data was performed by K. G. Johnson using the R statistical programming language (R Development Core Team, 2011). Ordination analysis was performed to assess the overall similarity of the faunules (exposures), using Non-Metric Multidimensional Scaling (NMDS) of Bray-Curtis dissimilarities, calculated from square-root transformed generic abundance (Venables & Ripley, 2002).

Data on IWPCMB richness are derived from material held in NCB Naturalis (Leiden) and the NHM (London) that were mainly collected during the late nineteenth and early twentieth centuries (Leloux and Renema 2007, Johnson *et al*. 2011 – Palaeontological Assoc. abstract). Data on corals from the Miocene IWPCMB are currently being collated by members of the Throughflow Marie Curie Initial Training Network coordinated by the Natural History Museum, London (http://ipaeg.org/ throughflow).

4.3 Results:

4.3.1: Exposure Assessment:

Fossil corals were only obtained from deposits aged between 29.95 (± 0.27) – 27.67 (± 0.26) Ma (late Rupelian to early Chattian age). No corals were found at Junction Quarry, which was dated as 30.78 (± 0.26) – 30.44 (± 0.28) Ma (late Rupelian age; see Chapter 2 for locality age data). Most of the exposures contained corals that were in life-position or that were very close to being in life-position, suggesting that they were autochthonous in nature. Sediments near the bases of the exposures at Lake Quarry (LQ) and Rubbish Dump Quarry (RDQ) contained corals preserved in carbonates containing significant clay, but up-section the units became cleaner until the facies closely resembled the carbonates of the Gomantong Limestone Fm. exposed near Gomantong Caves. The source of the clay sediment input into the local area clearly diminished over time, between the Late Oligocene to the Early Miocene. The faunal elements other than the scleractinian corals collected from the study area, inclusive of echinoids and molluscs will be studied in future publications. Larger benthic foraminifera found commonly within this study area include *Eulepidina sp.*, *Heterostegina borneensis*, *Neorotalia mecatepensis* (ancestor to *Myogypsinoides*), *Lepidocyclina* (*Nephrolepidina*; of "isolepidine" type) (McMonagle *et al.*, 2011).

The number of specimens found at each locality varies from 2-541 (figure 1), this difference is due partly to sampling intensity, but is also influenced by preservation and accessibility within the exposure and the overall spatial area of the exposure, with more specimens collected from sites with better preservation, a larger, accessible surface area exposed. The most taxonomically rich (at genus-level) exposure is Sanctuary Quarry (SaQ). This exposure had the largest number of samples taken and also the largest number of taxon occurrences. An occurrence in figure 1 is a record of a genus in a given sample, and so it is directly affected by differences in the number of taxa present at an exposure and by the number of samples collected from a given exposure. SaQ only had the second largest number of specimens collected. Lower Sanctuary Quarry (LSaQ) has the largest number of specimens collected from it, second highest number of genera present the second largest number of occurrences, but the third highest number of samples taken. The third most taxonomically rich exposure is Lake Quarry

Figure 1. Table showing Taxon (genus), Sample, Occurrence and Specimen data for each exposure. Includes overall totals for entire study area. Exposures where timed-counts were performed are marked in blue.

Name of Exposure:	Number of Taxa	Number of Samples	Number of Occurrences	Number of Specimens
Lake Quarry	23	10	81	172
Lower Sanctuary Quarry	36	9	134	541
Mosque Quarry II	2	1	2	2
Mosque Quarry III	15	7	29	62
Neil's Quarry	2	1	2	5
Police Outcrop	19	1	19	97
Rubbish Dump Quarry	16	8	52	136
Sanctuary Quarry	37	11	138	440
Station West Quarry	15	1	15	87
Sukau Road Quarry	5	1	5	20
Total	**57**	**50**	**477**	**1562**

(LQ). It has the second highest number of samples taken, and the third highest number of occurrences and specimens collected. As LSaQ has the highest number of specimens collected but the third highest number of samples collected, on average, more specimens were collected per sample here when compared to SaQ or LQ. This means that fossils must have been easier to pick up at this locality (LSaQ) either because they were more abundant at this exposure, or because reef-fossils were more easily collected from this area as the sediment and fossils here may have been more loosely packed. From observation in the field, I would suggest that both of these reasons are true, as LSaQ did appear to have the highest abundance of easily accessible fossils present at the exposure. The two most taxonomically-rich areas are also the two exposures with the largest surface areas, however LQ had about the same surface area and accessibility as both Rubbish Dump Quarry (RDQ) and also Police Outcrop

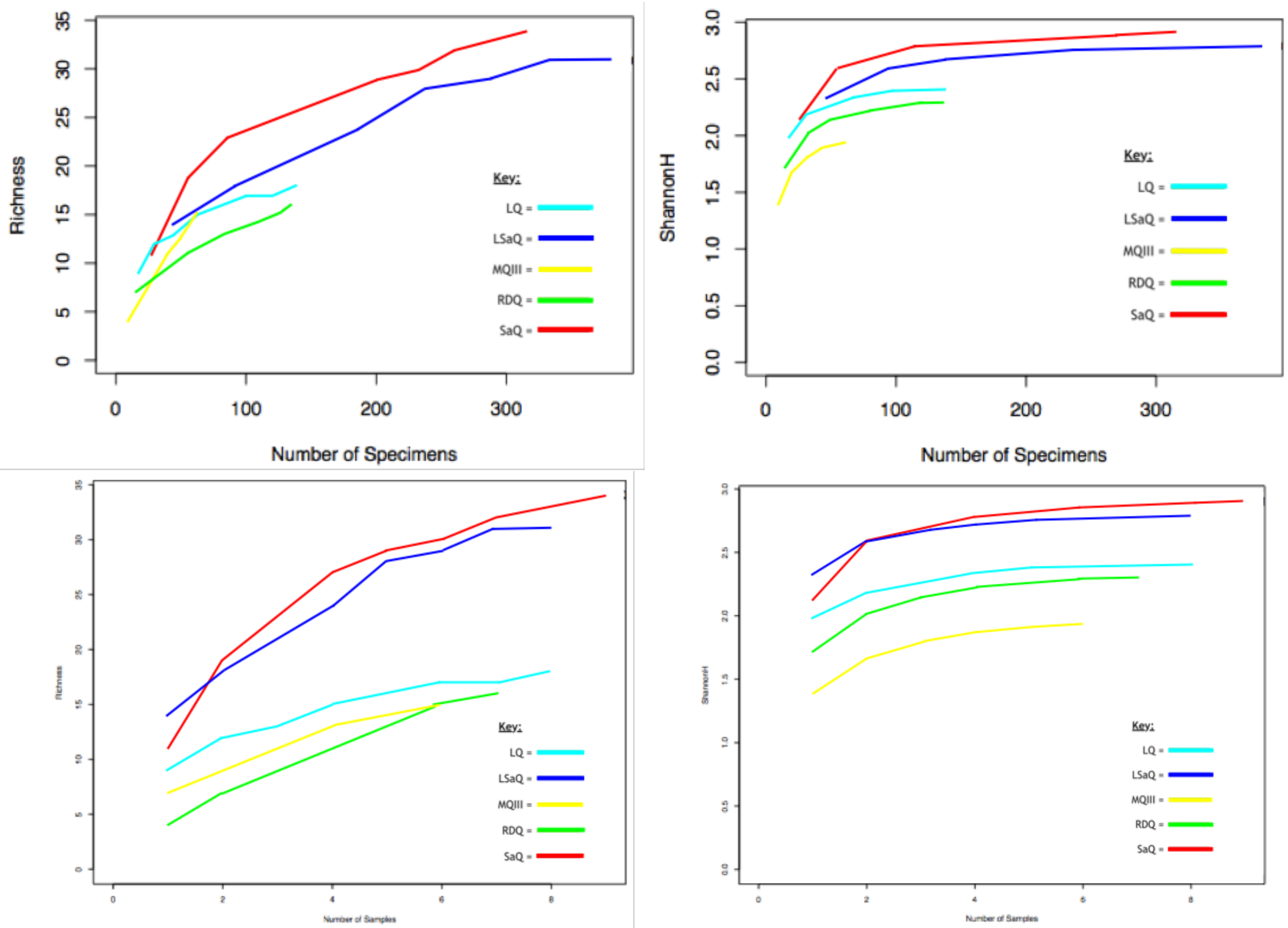
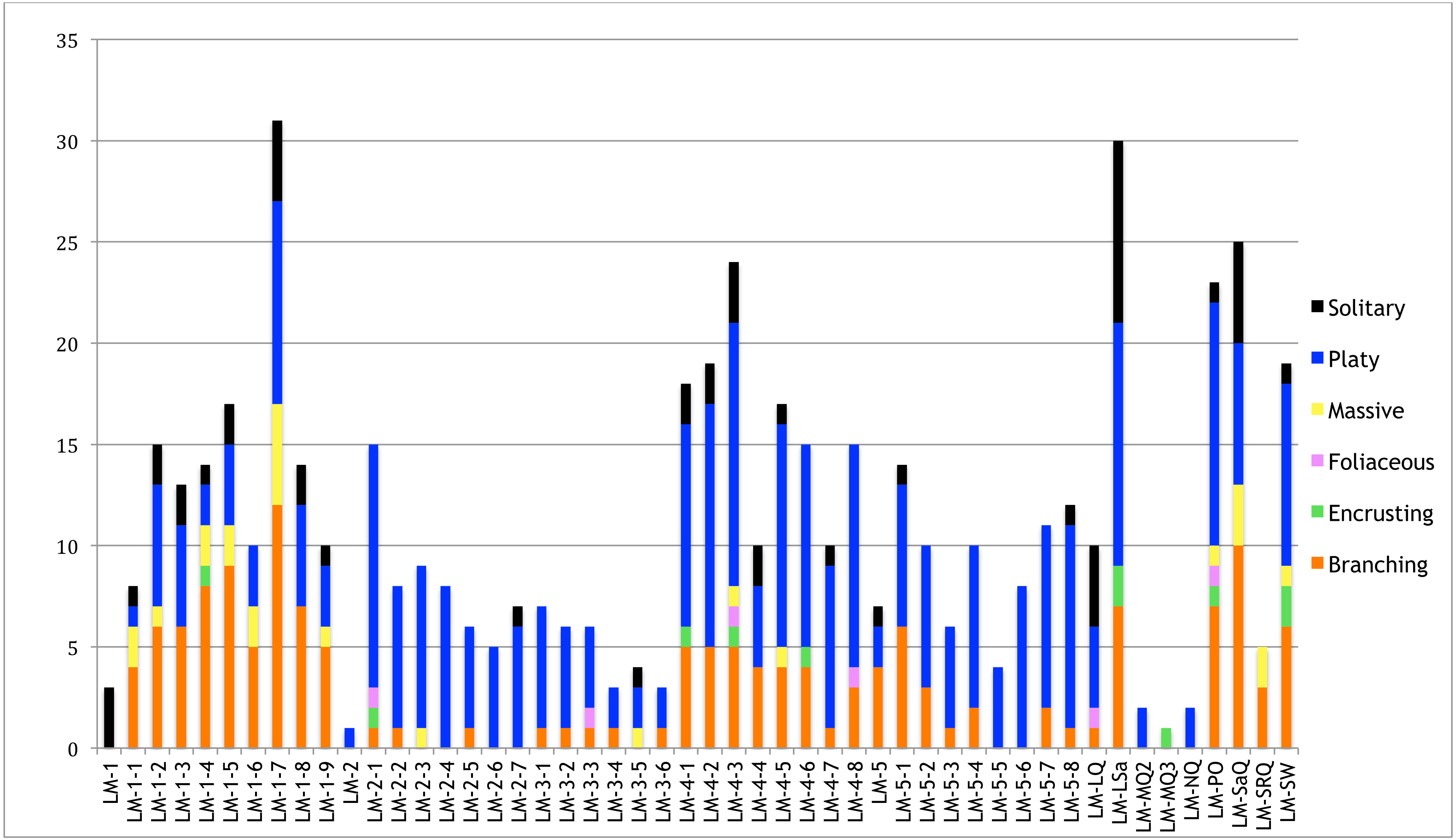


Figure 2: Graphs showing the cumulative richness and diversity by samples and specimens collected, illustrating the affect of additional sampling. Each curve represents a different timed count locality (random samples have been omitted); **a.** Generic richness *vs.* Specimens collected, **b.** Diversity (Shannon H) *vs.* Specimens collected, **c.** Generic richness *vs.* Samples taken, **d.** Diversity (Shannon H) *vs.* Samples taken.

(PO) (as all three areas were roughly vertical exposures), but it was more generically rich than either of these other two areas. This means that surface area and accessibility of exposures is not the only variable involved in predicting the taxonomic diversity found at each of the exposures.

For all the timed count localities studied, estimates of diversity levelled off after about 125 specimens or 5-6 samples were collected (figs. 2 b and d). It can be seen from figure 2 that the generic richness of SaQ and LSaQ is considerably higher than at other exposures collected from using the timed-count method. As previously mentioned, these exposures were somewhat more accessible than the others. It also can be seen in the cumulative Shannon H plots (Fig. 2 b. and d.), that these two areas do in fact contain slightly higher levels of biodiversity than the other three exposures analysed, as the curves for LSaQ and SaQ plateau at a higher value of the Shannon H diversity statistic (approx. 2.75, compared to values of under 2.5. for the other three localities). Fossils were much more closely-packed at LSaQ and SaQ, and this is believed to be due to differences in the depositional environment of the reefs preserved at these exposures, i.e. more different genera of reef corals could grow in these two localities compared to the other exposures studied, as they were more suitable for coral establishment and growth.

Because ecological sampling (timed count) methods were used, the richness curves for all assemblages (figs. 2 a and c) do not show the full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LM-1-6
LM-1-7
LM-1-8
LM-1-9
LM-2
LM-2-1
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LM-5
LM-5-1
LM-5-2
LM-5-3
LM-5-4
LM-5-5
LM-5-6
LM-5-7
LM-5-8
LM-LQ
LM-LSa
LM-MQ2
LM-MQ3
LM-NQ
LM-PO
LM-SaQ
LM-SRQ
LM-SW
Solitary
Platy
Massive
Foliaceous
Encrusting
Branching

Figure 3. (*previous page*) Stacked histogram showing the distribution of colony growth form types found in each sample. The timed count samples (1 to 5-8) are first. The locality numbers are: 1/SaQ = Sanctuary Quarry, 2/RDQ = Rubbish Dump Quarry, 3/MQ3 = Mosque Quarry III, 4/LSa = Lower Sanctuary Quarry, 5/LQ = Lake Quarry, MQ2 = Mosque Quarry II, NQ = Neil's Quarry, PO = Police Outcrop, SRQ = Sukau Road Quarry, SW = Station West Quarry. Timed count sample numbers range from 1 – 9 (0 = random sample), where 1 = 10 min count, 2 = 20 min count etc. (e.g. 1-3 = 30 minute sample from Sanctuary Quarry).

number of genera that could possibly be found at the exposures. Ecological sampling methods (such as timed counts or transects) can cause rare taxa to be missed when compared to random sampling methods. This is further demonstrated by addition of the random sampling results, which increases the total number of genera found at all localities. Timed count sampling richness estimates can be seen in figure 2 a and c, and the timed count plus the random sampling richness is seen in the "No. of Taxa" column in figure 1.

The overall number of coral specimens found and identified is 1562 (see figure 1 or Appendix 2), consisting of 57 probable genera (48 of which are identified in Chapter 3) and approximately 100 morpho-species (as, due to preservation quality, full species identification is very difficult in many cases). The most common genera of corals found are: *Porites* (185 specimens), *Pachyseris* (162), *Lophelia* (133 specimens), *Stylophora* (128 specimens), *Leptoseris* (123 specimens), *Oulophyllia* (116 specimens) *Hydnophora* (91 specimens), *Actinacis* (84 specimens);

these are all represented in this collection by corals with either platy or branching colony growth forms, with the exception of *Porites* and *Actinacis*, which exhibit both branching or plate-shaped colonies (figure 8), and *Stylophora* which has species with both branching and encrusting growth forms. In general, most specimens come from taxa characterised by plate-shaped colonies (figure 3). From the study area as a whole, the most common colony growth forms are: platy - 826 specimens (53% of total), followed by branching - 374 specimens (24% of total) (Appendix 2). Following from the work of Rosen *et al.* (2000), this dominance of platy corals categorises this assemblage as a “platy coral assemblage”, and the growth type present is “suprastratal”, as epibionts such as bryozoans and coralline algae are common on the undersides of the coral fossils. There are some solitary, massive, encrusting and foliaceous corals present, but these make up a minority (23%) of the total specimens collected.

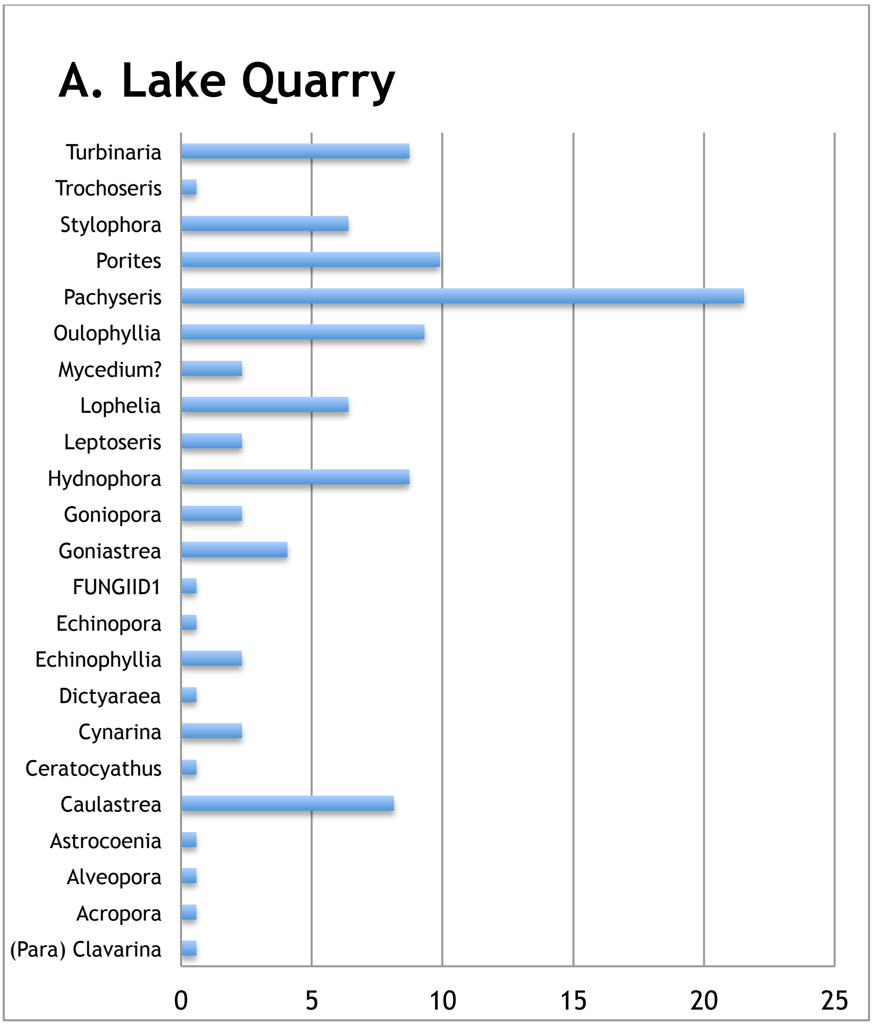
In the timed count samples, platy corals dominate at MQIII, LSaQ, RDQ and LQ, with LSaQ being the locality where the largest numbers of platy coral specimens were found (see figure 3). Branching corals dominate at Sanctuary Quarry (SaQ). Random samples made up 12 of the 50 total samples taken (24% of all samples), and 22% of the total specimens collected. In the random collections, platy corals were most commonly found at Police Outcrop (PO), Station West Quarry (SW), LSaQ, LQ (LQ sample) and RDQ (figure 3). High numbers of branching corals were found in the random samples at Sukau Road Quarry (SRQ), LQ (5-0 sample) and SaQ. The highest numbers of massive and solitary corals, in both timed and random samples were found at SaQ and

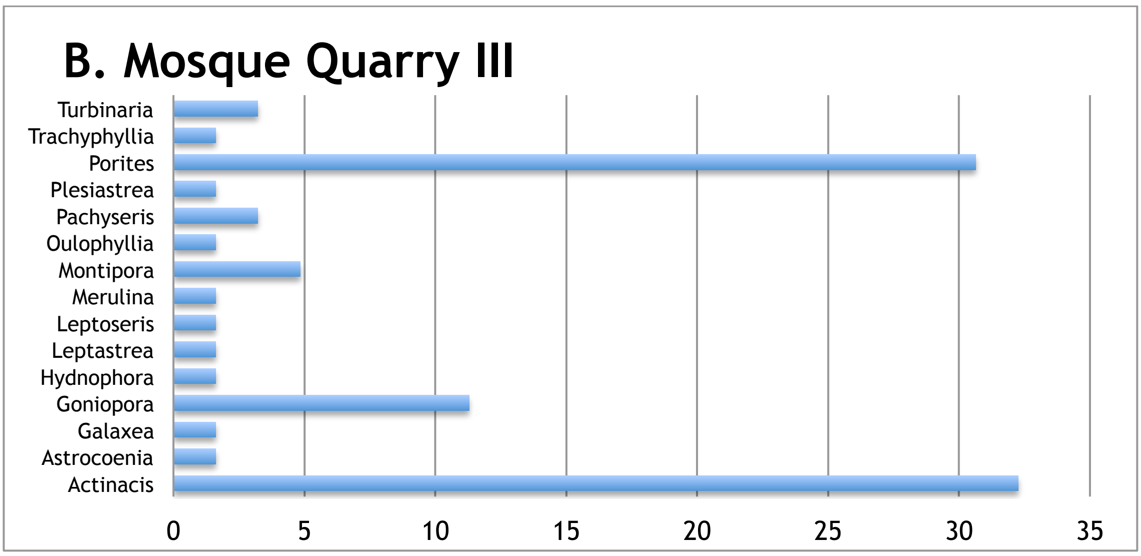
LSaQ, but there were far fewer of these types of coral present than platy and branching growth forms (figure 3).

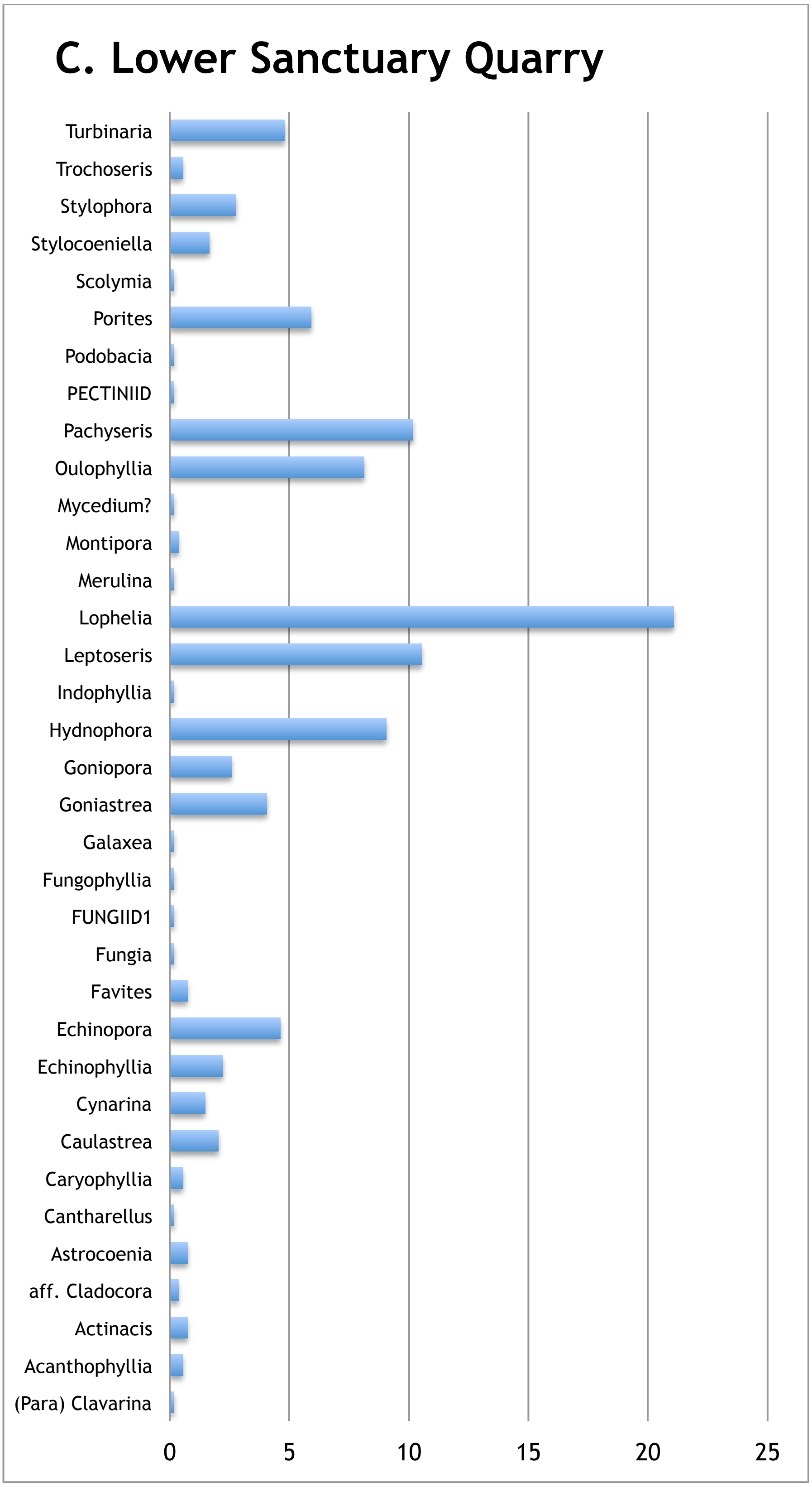
The Bray-Curtis dissimilarity tree (figure 5; from data in Appendix 2) shows that there are up to four possible groupings of exposures: PO and SW; RDQ and MQ3; LQ and LSaQ, and SaQ. In the NMDS ordination plot of these Bray-Curtis dissimilarities (Fig. 6.) most of the exposures group together in the top part of the plot, apart from SaQ which can be observed in the lower left-hand corner. It is unlikely that the locality exposures are grouped by geologic age, as the dating in Chapter 2 places them all as roughly contemporaneous. The localities are also not grouped by geographic location, as RDQ and SaQ would have plotted closer to LSaQ and LQ if that were the case. SW and PO may be grouped most closely together because they were located in a similar geographical area (although not located as closely as LQ, RDQ and LSaQ) but also, perhaps, because both were sampled by random methods therefore collector bias cannot be discounted for these two exposures.

The genera with the highest percentage compositions found within the entire study area are Porites (12%) and Pachyseris (10%), closely followed by Lophelia (9%), Stylophora (8%) and Leptoseris (8%) and Oulophyllia (7%) (See Figure ?, G.). The three most common genera at each locality are as follows: SaQ has Porites, Stylophora and Actinacis (combined make 45% of specimens collected; see fig. 4, F); LQ has Pachyseris, Porites and Oulophyllia (40% of specimens collected; see fig. 4, A); MQ3 has Porites, Actinacis and Goniopora

Figure 4. (A-G): Bar charts of percentage composition by genus of each exposure (A-F) and of the Study Area as a whole (G). In all bar charts: y-axis = genera present, x-axis = percentage composition.






C. Lower Sanctuary Quarry
Turbinaria
Trochoseris
Stylophora
Stylocoeniella
Scolymia
Porites
Podobacia
PECTINIID
Pachyseris
Oulophyllia
Mycedium?
Montipora
Merulina
Lophelia
Leptoseris
Indophyllia
Hydnophora
Goniopora
Goniastrea
Galaxea
Fungophyllia
FUNGIID1
Fungia
Favites
Echinopora
Echinophyllia
Cynarina
Caulastrea
Caryophyllia
Cantharellus
Astrocoenia
aff. Cladocora
Actinacis
Acanthophyllia
(Para) Clavarina
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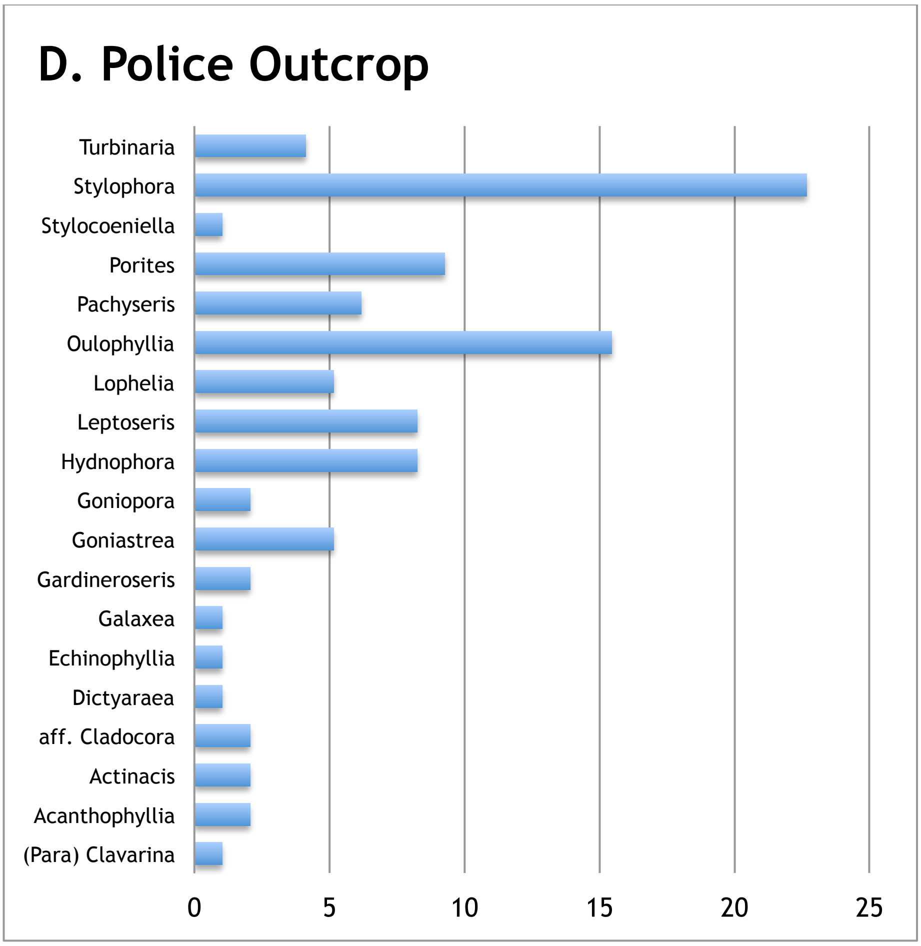
25


D. Police Outcrop
Turbinaria
Stylophora
Stylocoeniella
Porites
Pachyseris
Oulophyllia
Lophelia
Leptoseris
Hydnophora
Goniopora
Goniastrea
Gardineroseris
Galaxea
Echinophyllia
Dictyaraea
aff. Cladocora
Actinacis
Acanthophyllia
(Para) Clavarina
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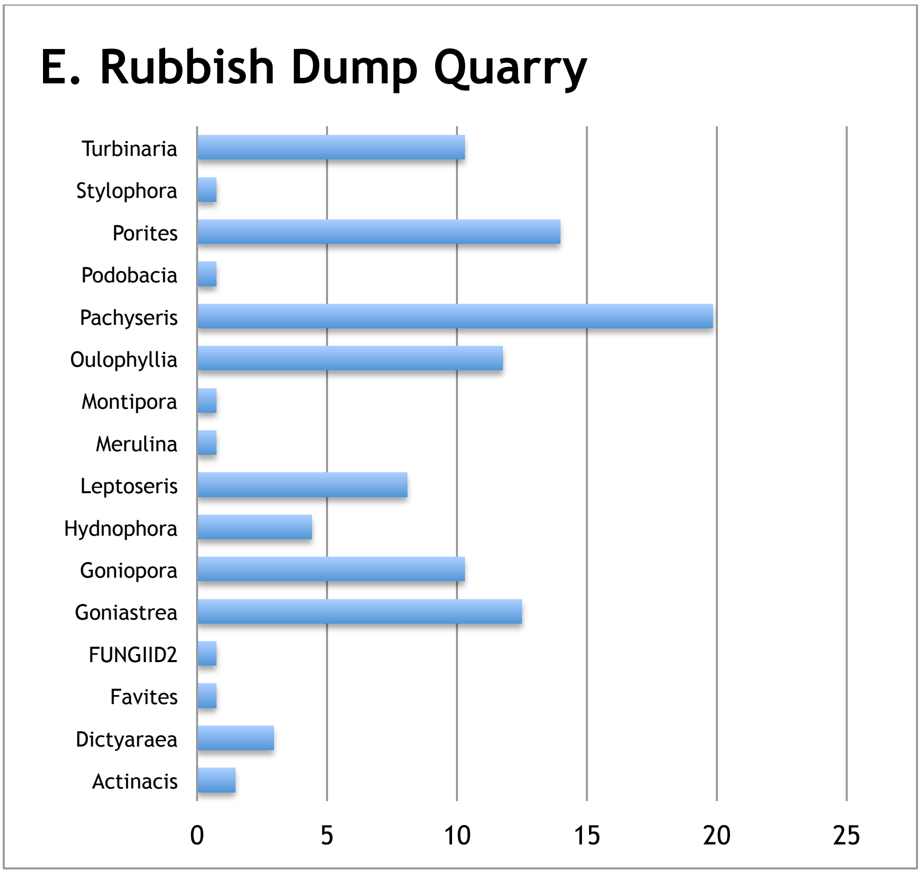
E. Rubbish Dump Quarry
Turbinaria
Stylophora
Porites
Podobacia
Pachyseris
Oulophyllia
Montipora
Merulina
Leptoseris
Hydnophora
Goniopora
Goniastrea
FUNGIID2
Favites
Dictyaraea
Actinacis
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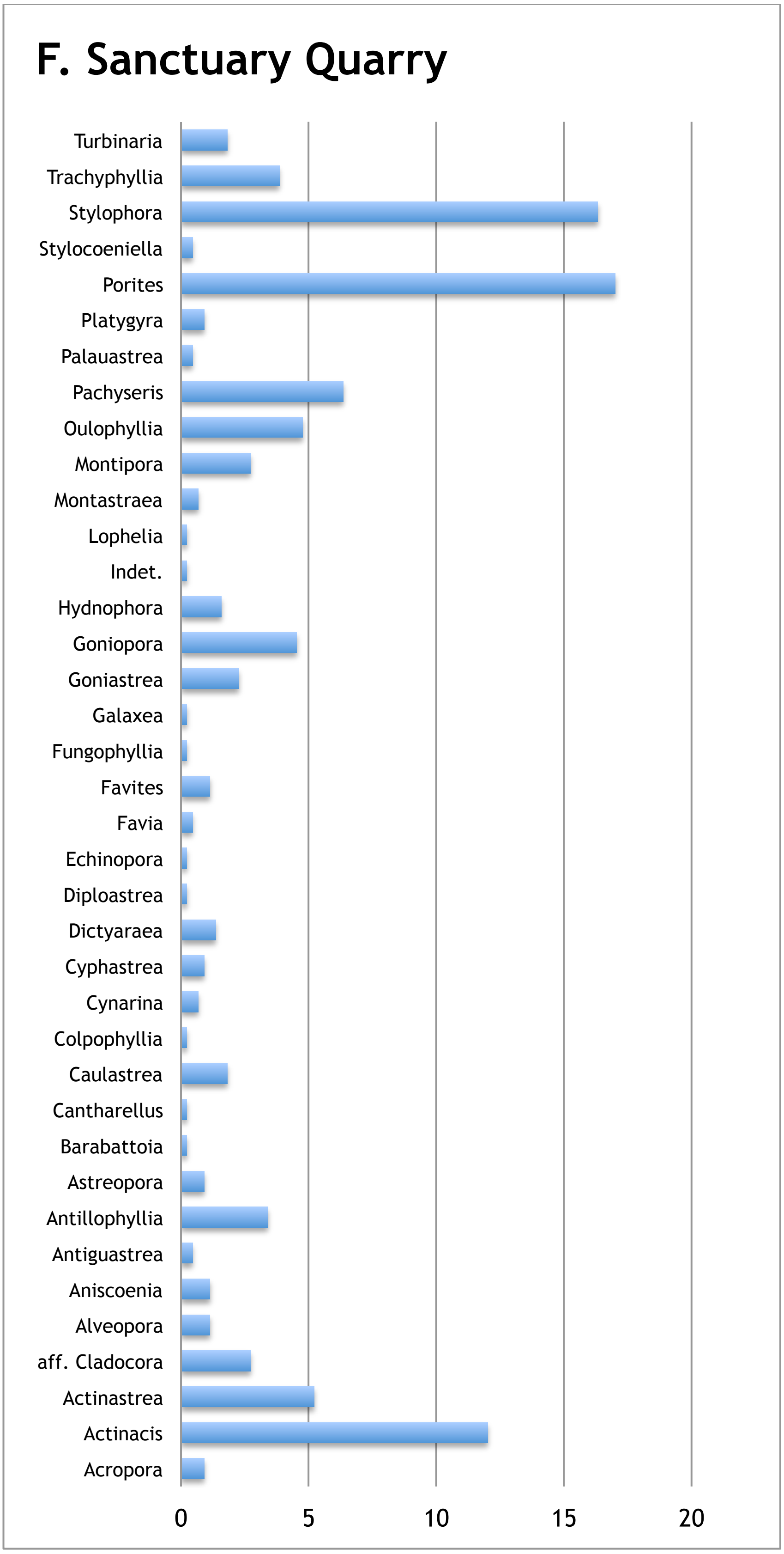
F. Sanctuary Quarry
Turbinaria
Trachyphyllia
Stylophora
Stylocoeniella
Porites
Platygyra
Palauastrea
Pachyseris
Oulophyllia
Montipora
Montastraea
Lophelia
Indet.
Hydnophora
Goniopora
Goniastrea
Galaxea
Fungophyllia
Favites
Favia
Echinopora
Diploastrea
Dictyaraea
Cyphastrea
Cynarina
Colpophyllia
Caulastrea
Cantharellus
Barabattoia
Astreopora
Antillophyllia
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Aniscoenia
Alveopora
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Actinastrea
Actinacis
Acropora
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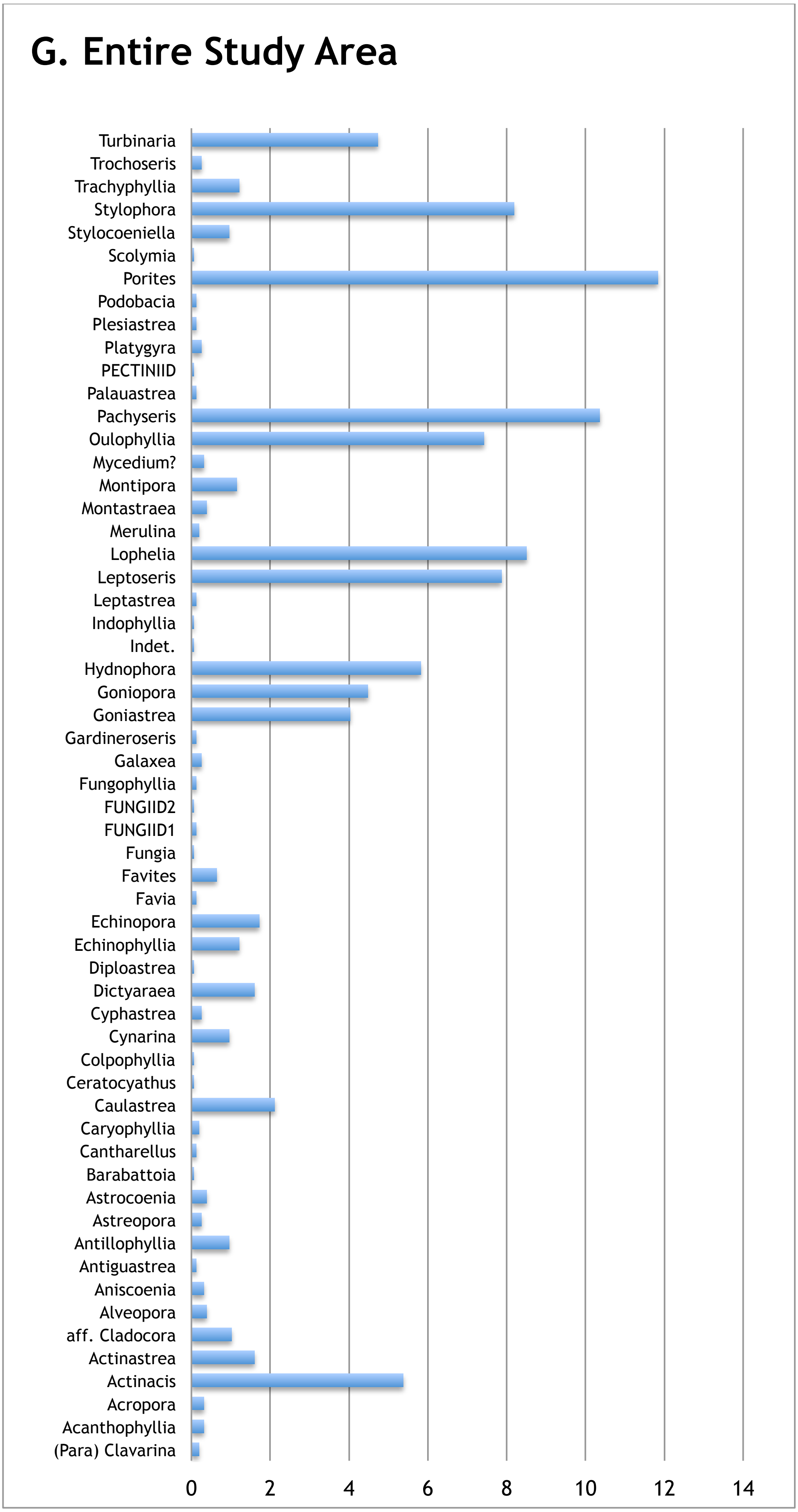
G. Entire Study Area
Turbinaria
Trochoseris
Trachyphyllia
Stylophora
Stylocoeniella
Scolymia
Porites
Podobacia
Plesiastrea
Platygyra
PECTINIID
Palauastrea
Pachyseris
Oulophyllia
Mycedium?
Montipora
Montastraea
Merulina
Lophelia
Leptoseris
Leptastrea
Indophyllia
Indet.
Hydnophora
Goniopora
Goniastrea
Gardineroseris
Galaxea
Fungophyllia
FUNGIID2
FUNGIID1
Fungia
Favites
Favia
Echinopora
Echinophyllia
Diploastrea
Dictyaraea
Cyphastrea
Cynarina
Colpophyllia
Ceratocyathus
Caulastrea
Caryophyllia
Cantharellus
Barabattoia
Astrocoenia
Astreopora
Antillophyllia
Antiguastrea
Aniscoenia
Alveopora
aff. Cladocora
Actinastrea
Actinacis
Acropora
Acanthophyllia
(Para) Clavarina
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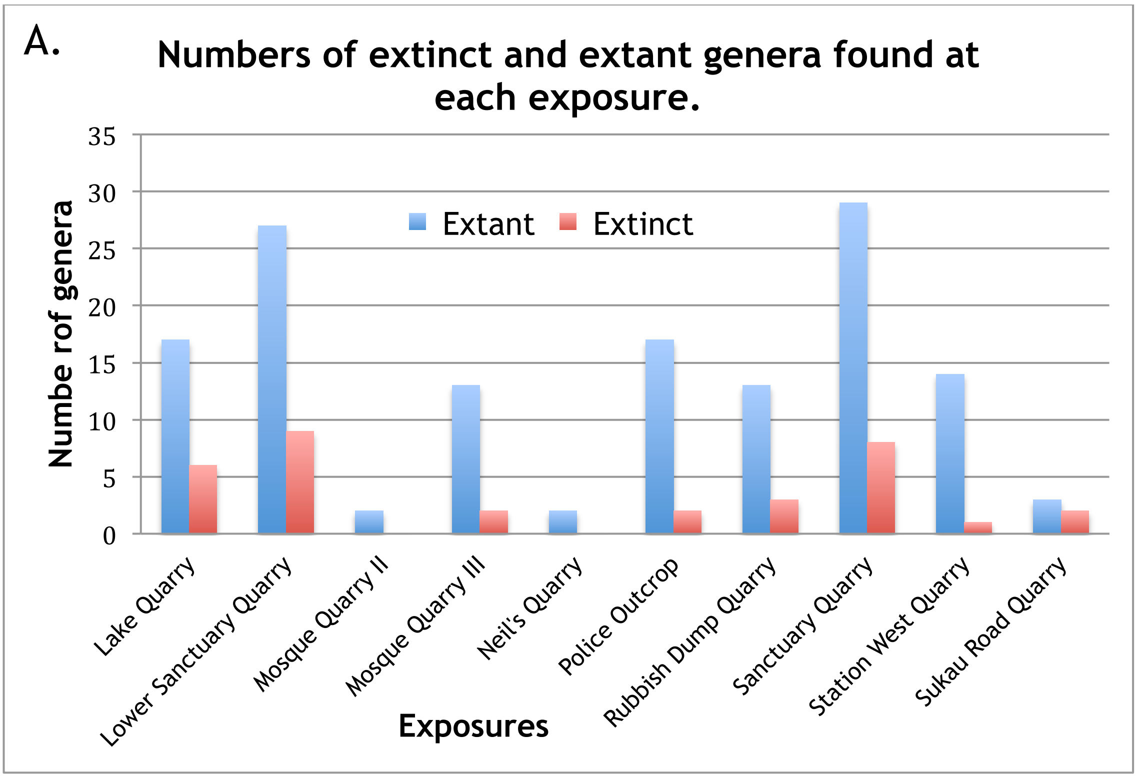
14

(73% of specimens collected; see fig. 4, B); LSaQ 41% has Lophelia, Leptoseris and Pachyseris (41% of specimens collected; see fig. 4, C); PO 47% has Stylophora, Oulophyllia and Porites (47% of specimens collected; see fig. 4, D); and RDQ has Pachyseris, Porites and Goniastrea (46% of specimens collected; see fig. 4, E). The fact that the three most common genera at each locality are different implies that environmental conditions at each of these localities varied.

Sanctuary Quarry has plotted as an outlier to the main grouping. It has a slightly larger proportion of zooxanthellate to azooxanthellate genera present, but has similar proportions of extant to extinct genera as LSaQ (see fig. 5, A and B). It seems most likely that this exposure is most dissimilar to the others based on the high proportion of branching colony growth forms found at this location, implying a significant difference in the depositional environment at this location that favoured the growth of branching coral growth forms.

Between 0 and 40 % of the genera found in every locality became extinct between the Late Oligocene and the present day (figure 6A). The highest numbers of both extinct and extant coral genera are found in LSaQ and SaQ. The number of extant coral genera collected from these exposures is much higher than the number of extinct genera. There is an overall extinction level of approximately 14% for the genera present within the entire study area. If only the timed count localities are looked at, the percentage of genera that have gone extinct is 19-25% (average = ~20%). The inclusion of randomly



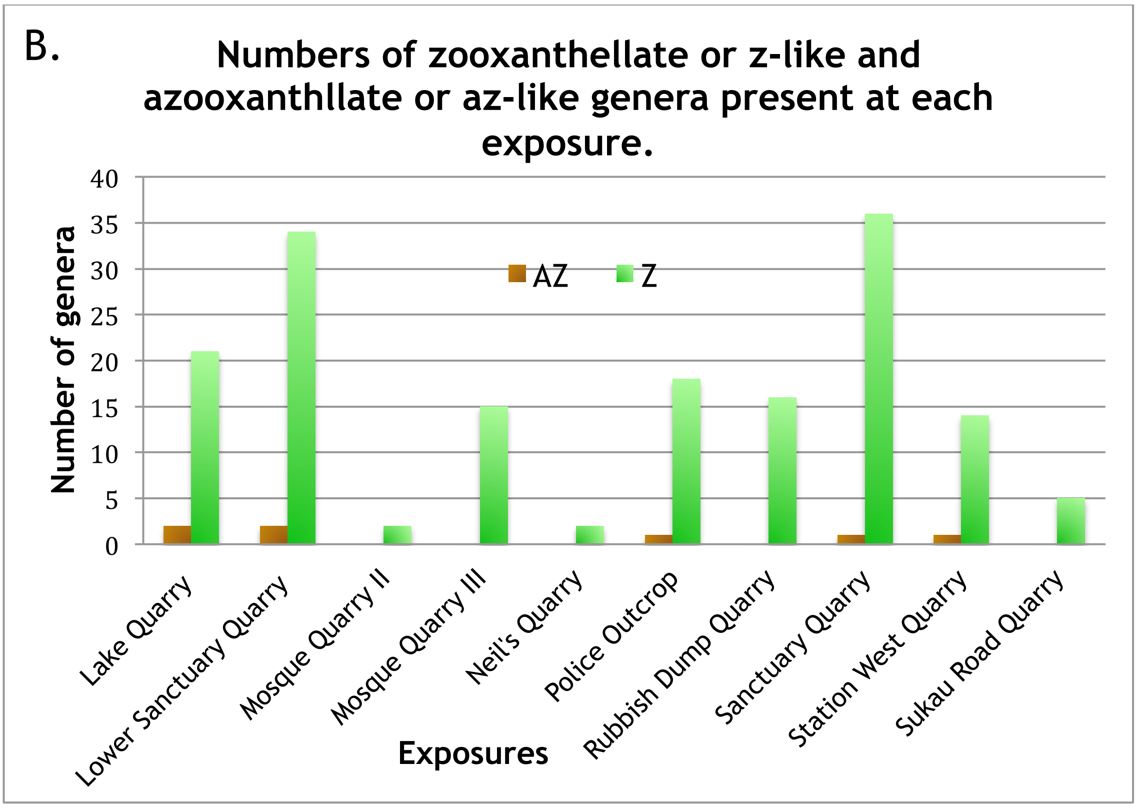


Figure 5. Histograms showing: **A**) the numbers of extinct and extant genera at each locality, and **B**) the numbers of zooxanthellate and azooxanthellate genera at each locality. Data is from both timed and random sampling.

sampled localities reduces the extinction level observed.

There are a total of 7 az/az-like and 39 z/z-like coral genera described in this work (Chapter 3 and Appendix 2); including the undescribed genera, there are 13 az/z-like and 40 z/z-like genera of coral found. The localities contain

Figure 6. Bray-Curtis dissimilarity tree of exposures where no. of specimens collected is >50.

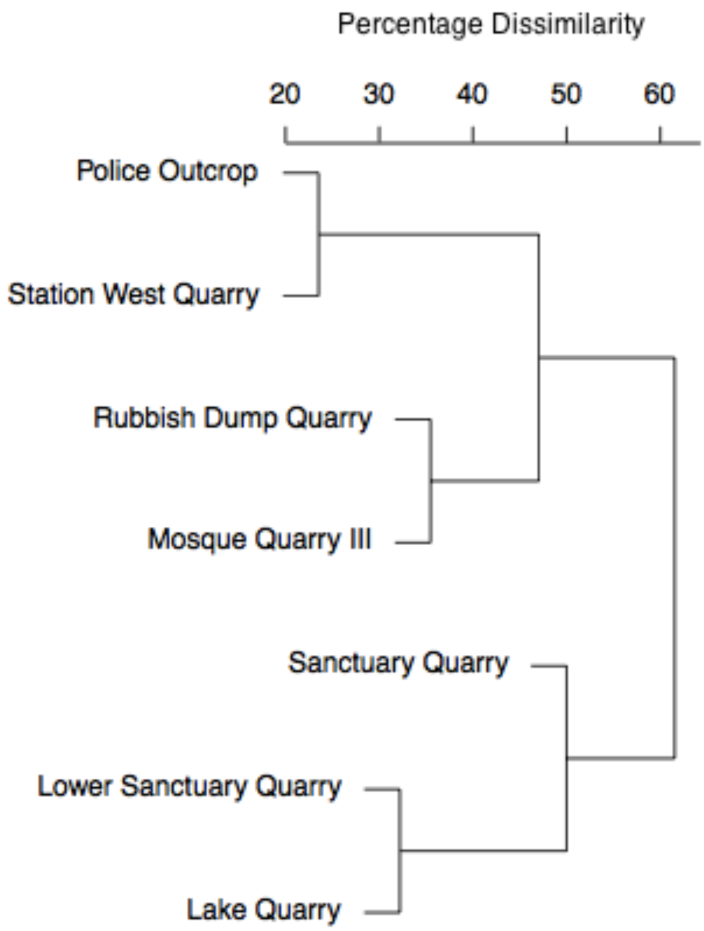
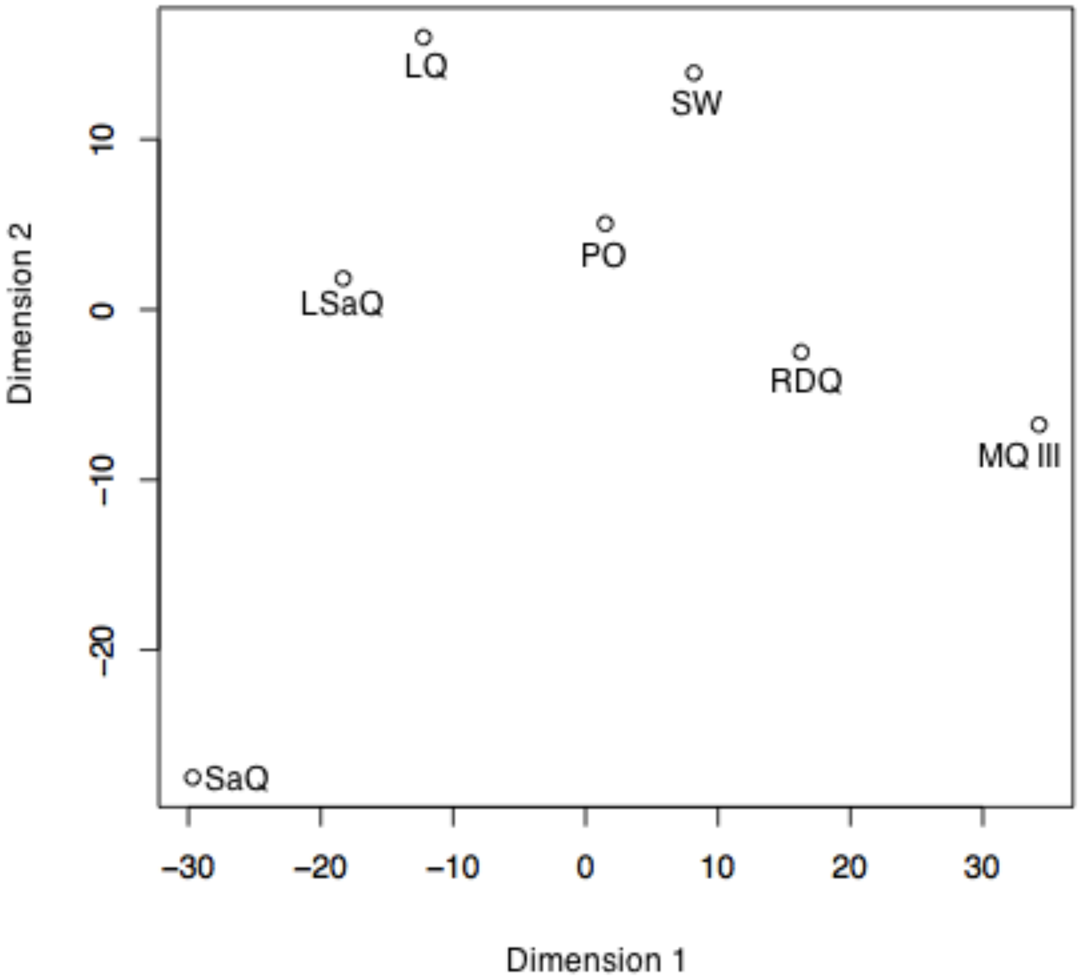


Figure 7. Non-metric Multi-dimensional Scaling plot of Bray-Curtis dissimilarities for all exposures where no of specimens collected is >50.



between 1 and 36 genera of z/z-like coral genera. An average of 89% z/z-like genera are present over all localities (figure 5, B). Again, if only the timed sampled localities are assessed, the percentage of z/z-like corals increases from 89% to 98%. The dominance of in situ reef-corals (z and z-like) confirms an interpretation of a shallow-water habitat for these corals (i.e. growing in the photic zone).

Interesting coral specimens were found at many of the sites, including the earliest record of *Podobacia crustacea* and 2 new species attributed to the genus *Lophelia*, which are only known from cold and deep water habitats in the present day, however these specimens show adaptations to a shallow water environment as they have more delicate skeletons than modern *Lophelia*. There is also a very common species of what has been identified as a member of the genus *Oulophyllia*, but it has a flat, platy growth form rather than a massive growth form like modern *Oulophyllia* (see Chapter 3 for descriptions of these specimens). Many of the species described are in open nomenclature, but with more detailed study it is possible that there could be up to 39 new species of reef coral found from this area.

A pattern in the distribution of the poritid corals *Actinacis* (an extinct poritid genus) and *Porites* (an extant poritid genus) has been observed in this study area. In most localities either platy forms or branching forms are dominant (figure 8), to the exclusion of the other growth form; the only exceptions are SaQ and PO. Branching forms dominate in the former, but some platy growth forms were also found (although in much lower numbers than the branching forms). Platy corals dominate at exposure PO, but at least one branching specimen was also found at this location. The pattern of the poritid coral growth forms (figure 7) appears to follow the pattern of branching and platy coral dominance at each locality (figure 3), i.e. where branching corals are the most common growth form there are branching *Actinacis* and *Porites*, but where platy corals are the dominant growth form there are platy *Actinacis* and *Porites*. Further study is required to assess the dependency of this result,

	Porites		*Actinacis*	
Sample	Branching	Platy	Branching	Platy
LM-1-1	1 (1)	0	1 (2)	0
LM-1-2	0	0	1 (1)	1 (1)
LM-1-3	1 (2)	1 (1)	1 (7)	0
LM-1-4	1 (5)	1 (1)	1 (4)	0
LM-1-5	1 (1)	0	1 (7)	1 (1)
LM-1-6	1 (19)	0	1 (1)	0
LM-1-7	1 (17)	0	1 (7)	1 (1)
LM-1-8	1 (5)	0	1 (2)	0
LM-1-9	1 (4)	0	0	1 (1)
LM-2-1	0	1 (5)	0	1 (1)
LM-2-2	0	1 (1)	0	1 (1)
LM-2-3	0	1 (1)	0	0
LM-2-4	0	1 (3)	0	0
LM-2-5	0	1 (2)	0	0
LM-2-6	0	1 (3)	0	0
LM-2-7	0	1 (4)	0	0
LM-3-1	0	1 (4)	0	1 (4)
LM-3-2	0	1 (5)	0	1 (8)
LM-3-3	0	1 (2)	0	1 (3)
LM-3-4	0	1 (3)	0	1 (2)
LM-3-5	0	1 (2)	0	0
LM-3-6	0	1 (3)	0	1 (3)
LM-4-1	0	1 (2)	0	1 (1)
LM-4-2	0	1 (3)	0	1 (1)
LM-4-3	0	1 (6)	0	0
LM-4-4	0	1 (6)	0	1 (1)
LM-4-5	0	1 (7)	0	1 (1)
LM-4-6	0	1 (2)	0	0
LM-4-7	0	1 (2)	0	0
LM-4-8	0	1 (4)	0	0
LM-5-1	0	1 (6)	0	0
LM-5-2	0	1 (4)	0	0
LM-5-3	0	1 (1)	0	0
LM-5-4	0	1 (2)	0	0
LM-5-5	0	1 (1)	0	0
LM-5-6	0	1 (1)	0	0
LM-5-7	0	1 (2)	0	0
LM-5-8	0	0	0	0
LM-PO	0	1 (9)	1 (1)	1 (1)
LM-SaQ	1 (19)	0	1 (16)	1 (1)
LM-SRQ	1 (12)	0	1 (1)	1 (2)
LM-SW	0	1 (2)	0	0

Figure 8. This table shows the presence and absence, and actual numbers of specimens (in parentheses) of platy and branching colony growth forms in corals belonging to the genera *Actinacis* and *Porites* that were found within the study area. Sample numbers are the same as in figure 3.

as *Porites* and *Actinacis* are two of the more common genera found in the study area. It appears possible that both *Porites* and *Actinacis* have skeletal morphologies that can adapt to varying local environmental conditions. It has already been suggested that *Actinacis rollei* Reuss exhibits plasticity of growth form (Bosellini and Russo, 1995) and can be either branching or platy depending on local environmental conditions. It remains to be seen whether the same is true of members of the genus *Porites* in this case, as members of the genus from this study area were not well preserved and have not been identified to species level (they have been grouped according to their overall growth form), however further study would clarify this intriguing observation.

4.3.2: Diversity of Late Cenozoic IWPCMB:

The coral assemblage studied here makes up the second richest collection of fossil corals so far described from the Cenozoic of the IWPCMB (see figure 9). It is also the third richest assemblage from all three high diversity areas (only the Pliocene of the IWP and the Late Oligocene of the Mediterranean are richer). The present study has the largest number of specimens collected out of all intervals of the Cenozoic fossil record of the IWPCMB, and the generic richness is approximately equivalent to the richness observed in the Middle Miocene of the IWPCMB. However, it is possible that the Miocene and Pliocene were richer, and they have not been sampled as thoroughly. Numbers of samples, occurrences and specimens are less for these two epochs than for this Late Oligocene IWPCMB collection. The Pleistocene of this region is well-sampled, but these samples do not contain as many specimens as those in the

Epoch Divisions	No. of Genera	No. of samples	No. of Occurrences	No. of Specimens
Indo-West Pacific				
Middle Eocene	6	3	36	7
Late Oligocene	57	50	477	1562
Early Miocene	51	20	96	140
Middle Miocene	55	31	150	259
Late Miocene	40	15	72	119
Pliocene	69	39	252	499
Pleistocene	44	91	225	296
Caribbean				
Late Oligocene	35	131	671	1034
Early Miocene	26	203	553	4724
Middle Miocene	29	62	304	1395
Late Miocene	36	129	600	3386
Pliocene	40	194	1168	5807
Pleistocene	36	133	1009	3972
Mediterranean				
Early Oligocene	52	?	?	?
Late Oligocene	74	?	?	?
Early Miocene	53	?	2637 total occurrences for all epochs	?
Middle Miocene	50	?	?	?
Late Miocene	19	?	?	?

Figure 9: This table shows the genera, sample, occurrence and specimen data (as detailed in figure 1), for reefal corals, for the Indo-West Pacific, Caribbean and Mediterranean biogeographic regions. Data are split into totals for each epoch (including subdivisions) from the Eocene (oldest) to the Pleistocene (youngest). Specimens (*continued on next page*)

(*cont…*) and taxa are standardised units but samples are not, (although they should give a rough idea of the study intensity at a specific area and timeframe). Data from K. Johnson, *unpublished data* (IWP); Leloux & Renema, 2007 (IWP); Johnson *et al.*, 2008 (Car.) & Bosellini and Perrin, 2008, calculated from figure 4 (Med.), except for the Late Oligocene IWP data from the present study, included in blue.

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present study, and it is possible that the Pleistocene may also have had more undiscovered generic richness present. There is an apparent large increase in the number of genera found in the IWP between the Middle Eocene and the Late Oligocene, from 6 to 57 (figure 9), but relatively few Eocene coral occurrences have been recorded in the studied collections. In the Eocene epoch, 7 specimens account for 6 discovered genera, so again it may be possible to find further generic richness in the region for this epoch if more specimens can be found and collected.

The diversity of each epoch of the Cenozoic IWPCMB is illustrated in figure 10. One hundred specimens have been taken at random from each epoch and the number of genera (taxa) represented has been plotted, along with two diversity measures: Fisher's alpha and Shannon's H. This method has seriously underestimated the taxonomic richness and diversity for the Oligocene epoch compared to all the other epochs of the Cenozoic IWPCMB (compare fig. 10 with fig. 9). The problem with this outcome is that the results have been affected by the sampling methods used. Figure 11 illustrates the difference in the collections of coral specimens in each sub-epoch. The ecological sampling method gives more specimens of common genera, and less specimens of rare genera, and can be seen in the collection from the Late Oligocene epoch (this work).

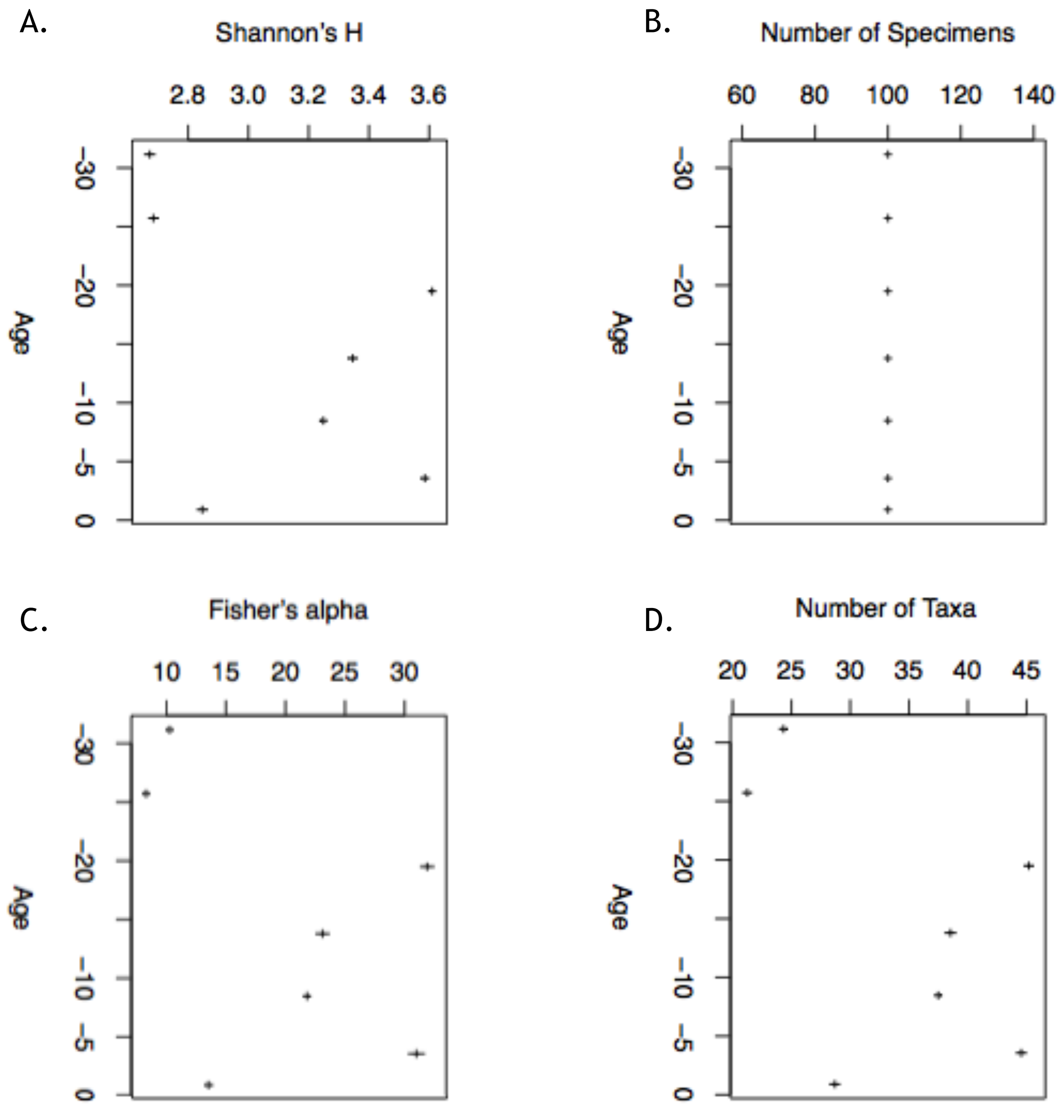

Figure 10. Illustrating the pitfalls of using un-standardised sampling methods: Comparative Cenozoic IWP diversity measures by end-point of epoch (100 specimens randomly selected from each epoch's collections; fig 10, B). The epochs used are Eocene, Oligocene, Miocene, Pliocene and Pleistocene; taxa = genera. Graphs show: A- Shannon H diversity measure, B- Number of specimens chosen at random, C- Fisher's alpha diversity statistic, D- Number of taxa (genera) represented in the sample.

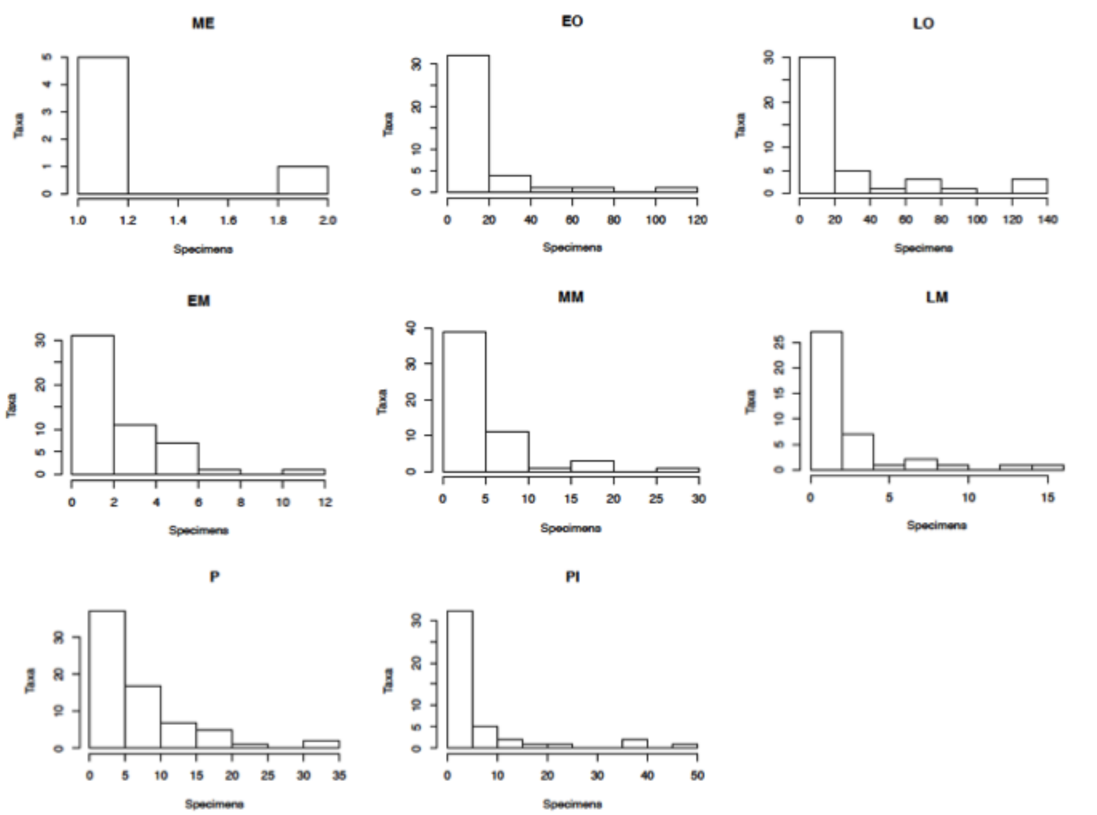

Figure 11. Illustrating the pitfalls of using un-standardised sampling methods: Graphs showing the distribution of fossil scleractinian specimens found within each genus for the Indo-West Pacific region by epoch subdivision from the mid-Eocene (ME) until the Pleistocene (Pl). Ecological sampling means common taxa are represented by large numbers of specimens, and rare taxa are represented by low numbers of specimens. Random sampling gives a lower numbers of specimens for all taxa found. N.B. the graphs above have different x- and y-axis values.

Random collecting has given few specimens of many genera for all the other collections represented in figure 11, except possibly the Early Oligocene. This means that when extracting 100 specimens at random from each collection, you are likely to get fewer taxa represented in the Oligocene samples when compared with the other epochs e.g. you could pick out 100 specimens of *Porites* from the Late Oligocene coral collection, but you could pick 50+ genera from a collection that contains just 1 or 2 specimens of each genus identified. Until the collections made from other epochs are re-sampled using ecological sampling methods, or the sampling methods are checked and made equivalent (as some collections may have been sampled using ecological methods), the diversity indices of other fossil collections from the IWP cannot be usefully compared to the collection made in this work, and vice versa.

4.3.3: Cenozoic Global Diversity Comparisons:

The average number of genera per sub-epoch from the Late Oligocene to the Late Miocene is about 50 for the IWPCMB, 57 for the Mediterranean and 31.5 for the Caribbean (from fig. 9). The proportion of extinct taxa occurring between the Late Oligocene and the present day is much lower in the IWPCMB (14-20%) than in the Caribbean region (figure 12); these data illustrate the stability and high level of generic richness present in the IWPCMB when compared to other regions with substantial reef building, between the Late Oligocene and the Late Miocene.

Epoch	Genera	Extant	Proportion extant
Late Oligocene	35	12	0.342857143
Early Miocene	36	15	0.416666667
Mid-Miocene	36	18	0.5
Late Miocene	42	23	0.547619048
Pliocene	41	25	0.609756098
Pleistocene	38	26	0.684210526

Figure 12. Showing proportion of extant genera of Scleractinian corals from the Caribbean region during the Late Oligocene to the Pleistocene.

To date, the Caribbean is the best sampled of the three regions, thanks to the work the Caribbean Coral Project and the Panama Paleontology Project (PPP) (e.g. Budd *et al.*, 1992; Budd *et al.*, 1994a; Budd *et al.*, 1994b; Johnson *et al.*, 1995 and many others), with a total of 4305 taxon occurrences that are mainly based on newly-collected material (figure 9), the Mediterranean is the next best sampled, with 2637 taxon occurrences (data from Bosellini & Perrin, 2008; extracted from a review of the literature (pbdb.org) rather than based on study of new collections or material held in museum collections). The IWPCMB is the least sampled region with just 1308 taxon occurrences (477 of which are from this study alone). The Late Oligocene of the Mediterranean is the most diverse epoch of coral growth, with 74 genera being found from this time and region, which is a similar number of genera to that found in the IWPCMB of the present day (Hoeksema, 2007), however as the Mediterranean has been sampled much more thoroughly than the IWPCMB for this epoch, this has the potential to change with more in-depth study of the IWPCMB.

The Caribbean has been very well sampled, however it still shows less diversity of genera than the IWPCMB. So the main result here is that the Late Oligocene in the IWPCMB region is more diverse than the Late Oligocene in the Caribbean, as more taxa have been recorded for the IWPCMB, even though the number of samples and occurrences are less, however the overall number of specimens collected is about 150 more for the IWPCMB region. This reflects that for some IWPCMB taxa, many specimens have been collected rather than just one or two. The Late Oligocene of the IWPCMB is also more generically diverse than all of the epoch divisions from the Caribbean, especially as fewer samples have been taken from the Late Oligocene IWPCMB. There are also fewer occurrences from the Late Oligocene IWPCMB than for most intervals in the Caribbean. Within the IWPCMB, generic richness has remained relatively high since at least the Late Oligocene.

4.4 Discussion:

4.4.1: Exposure Assessment:

When interpreting the results it should be noted that differences in the preservation of various structures of the coral skeletons might have influenced the numbers of specimens that could be identified. In this study, corals with a porous skeletal structure and some of the massive corals were typically less well preserved than other types of coral, so it is likely that these are under-represented in the overall numbers of specimens that were collected and successfully identified. Another source of inaccuracy in the specimen numbers may be, that when collecting fossils from a horizontal surface (vertical surfaces were also collected from when they could be reached), the branching corals have less surface area exposed and each individual coral organism may be represented by less specimens than the platy corals, which have a larger surface area. Therefore each individual platy coral organism may have accounted for more than one of the specimens collected, as hand-sized, loose and broken pieces were picked up, rather than entire corals. Large numbers of specimens were collected from each site to increase the accuracy of diversity estimates from each site.

The differences between the exposures studied appear to be due to growth form differences rather than the overall diversity at each site, as there is a mixture of generic assemblages at each of the exposures. There may be some difference in the compositions that are due to age of the deposits, but the resolution of the age dating in chapter 2 is not accurate enough to confirm this. The total error for most of the Sr isotope dates is 340,000-560,000 years.

The study area as a whole has a very high percentage of reef corals (z/z-like) present, meaning that light levels here were sufficient for the growth of many ecologically diverse taxa (i.e. the reefs were formed within the photic zone; within around 80m depth). This finding is also supported by the co-occurrence of larger benthic foraminifera (LBF), mainly *Lepidocyclina sp.* (Noad, 1998), that were often found in association with the platy corals (see Appendix 1). Larger benthic foraminifera are known to inhabit low-energy, shallow, marine environments (Fujita & Kato, 2011), possibly at depths of about 30-60 m (Bosellini *et al.*, 1987), placing them well within the photic zone. The main colony growth form encountered is platy, which implies a reduction in light penetration compared to an "average" reef (Rosen *et al.*, 2000).

Without detailed work on the sedimentology of the studied exposures, it cannot be said whether the probable reduction in light penetration is due to turbidity or depth, however the high clastic component of the sediment in which the fossils were preserved, may support the former suggestion. The high siliciclastic input to the area would have caused some turbidity and therefore would have reduced the depths at which photosynthetic organisms could survive, as it would decrease the depths to which light could penetrate (Rosen *et al*. 2000). It is not known whether this siliciclastic input was constant or periodic: the onset of the South Asian Monsoon in this region most probably occurred in the Early Miocene (Allen & Armstrong, 2012), and so post-dates the timeframe studied here. Borneo's climate at this time (Late Oligocene) is noted as "everwet" by Morley (2000), meaning the landmass "*received over 2000 mm of rainfall annually, with not more than 4 consecutive months with less than 100 mm rainfall in two years out of three*". Therefore run-off from the rivers of Borneo would have been substantial at this time. Seasonal or sporadic sediment input, however, could explain the inter-bedding of the LBF with the corals (see Appendix 1 photos). Differences in the two organisms' response to sedimentation could explain why each seems to survive better at different times. Larger foraminifera (from the Recent) can only live in places where conditions are favourable all year round, with some being sensitive to decreases in light levels and increases in nutrients (Renema and Troelstra, 2001). Corals are known to be able to survive in areas of relatively high turbidity (Perry et. al. 2008). More detailed study of the occurrence of larger benthic foraminifera compared to the corals in this area is required, and would aid further understanding of the depositional environment.

According to Sanders & Baron-Szabo (2005), near-chronic sedimentation and turbidity results in an assemblage of branched and solitary corals, as well as forms with relatively large calices. This is similar to the assemblage found at SaQ, which has *Favia* and *Favites* species *with* calice sizes of 4.9-20.0 mm, and has the largest number of solitary corals present (figure 3). It seems likely that sedimentation input and turbidity were therefore more continuous at SaQ than at other exposures. This may explain why SaQ plotted further away from all other exposures, implying that there was a significant difference in the environmental conditions in this location, or different responses to environmental conditions by corals growing within the exposure area.

Intraspecific plasticity in colony form may explain the pattern of the poritid coral growth forms (seen in figure 8), and has been described in extant *Porites* (Muko *et al.*, 2000; Forsman *et al.*, 2009), and given the exclusivity of the growth forms for both genera across all the localities, this variation may also be a within-species trait for *Actinacis*. The causal mechanism behind this growth form variation is likely to be a difference in the light levels at these sites, as some *Porites* species develop branching morphology in high light conditions, and platy morphology in lower light (Muko *et al.*, 2000).

Branching growth forms are presumably better adapted to higher light conditions, as absorbing light stops being the limiting factor in the growth of the corals, and a branching form places the polyps at various levels in the water column, allowing for greater circulation of water and food over the coral surface. Branching *Actinacis* has been found in other fossil reef localities said to be characterised by high sediment input (Mitchell, 2002; Bosellini & Russo, 1988), which could mean both high turbidity and high sedimentation rates. The corals here were deposited in carbonates with significant terrigenous components, therefore the light levels where branching *Actinacis* are found (in the fossil record) may not have been as high as would be expected for branching *Porites* forms to occur in the present day. If these corals were growing nearer the source areas of high sediment input, with high wave energy, then it is possible that branching morphology could be supported, as branching corals are thought to be better at sediment rejection than other growth forms (Stafford-Smith, 1993), however whether they actually grow in areas of chronic high sediment input remains to be seen. The platy coral growth form is thought to have evolved to provide a larger surface area for photosynthesis in lower light conditions (Rosen *et al.*, 2000).

4.4.2: Diversity of Late Cenozoic IWP:

Within the IWPCMB, generic richness has remained relatively high since at least the Late Oligocene, which must have contributed to its present status as a marine biodiversity hotspot. The low extinction level for the genera found in this study area (14%-20%) shows that most of the genera present have survived for at least 30 million years, so the conditions relevant to generic survival cannot have changed very much from the beginnings of the IWPCMB to the present day.

The ability of the IWPCMB to support diverse genera over a long period is likely to be a reflection of stable habitat area and high habitat diversity through time (Rosen 1981). The cause of this high diversity of habitat may be due to high levels of tectonic activity in the region over long periods of time (Renema *et al.*, 2008). Wilson & Rosen (1998) believe that because Paleocene and lower Eocene carbonates dominated by reef-coral development are rare in the IWP, the conditions suitable for zooxanthellate coral growth may have been sparse at these times due to tectonic conditions causing isolation from other coral-rich areas. Therefore it can be said that tectonic activity is important for the onset and maintenance of the IWP region of high marine biodiversity. The Eocene of the IWP is also poorly sampled in comparison to the Oligocene (and later epochs), so until more collections are made from epochs prior to the Late Oligocene (inclusive of the Early Oligocene), the origins of the diversity increase cannot be accurately known (1 Paleocene and 3 Eocene coral collections are all that were mentioned in Wilson & Rosen, 1998).

4.4.3: Cenozoic Global Diversity Comparisons:

According to currently available data (figure 9) the IWPCMB started to contain diverse numbers of reef corals from the Oligocene onwards, however it was only in the Miocene that the IWPCMB became the most diverse region for corals globally (i.e. became a hotspot for coral reefs), partly due to extinction in the Mediterranean region at this time. The generic diversity in the Mediterranean region was reduced in the Miocene due to slow regional climatic evolution resulting from the tectonically driven, northward migration of the region coupled with global cooling, with rare genera becoming preferentially extinct through time (Perrin & Bosellini, 2012). The Caribbean region, while having a high number of reef coral taxa throughout most of the Cenozoic has never reached the same generic richness levels as the IWPCMB or the Mediterranean (figure 9). This appears to be due to the high extinction levels for coral taxa in this region during the Cenozoic (see figure 12). These levels were caused by the cessation of coral dispersal (i.e. input of taxa) from the Mediterranean, deterioration of the climate in response to the onset of northern hemisphere glaciation, and changes in up-welling caused by the emergence of the Central American Isthmus (Budd, 2000; Johnson *et al.*, 2008 b). These findings support the theory of Rosen (1984; read in Rosen, 1988), who states that extinctions were regionally concentrated in the Atlantic (inclusive of the Caribbean) and Mediterranean due to the reasons given above.

The IWPCMB must have had conditions that allowed it to hold onto its high numbers of genera throughout the Late Cenozoic. Perhaps it was the large area through which taxa could be exchanged (from the Indian Ocean in the west to the Pacific Islands in the east), or stability of climate due to its stable latitudinal position through time (Hall *et. al.*, 2008), or even the large diversity of habitat present due to the dynamic tectonics of the region (Rosen, 1988; Hutchison, 2005). Unfortunately a full review of these factors is beyond the scope of this work.

4.5 Conclusions:

This study shows that a thriving and diverse reef system was already present in the Late Oligocene of Sabah, growing in an area of relatively high siliciclastic sediment input, and that further diversity may yet be found here.

Differences between the localities studied in this work may be due to depth, proximity to sources of sediment input, or position on the reef (possibly latitudinal differences) affecting the depositional environment, which in turn could affect overall species compositions within local areas. The coral colony growth forms that dominate the localities studied were mostly adapted to lower light levels and/or higher clastic input than on an average reef, but these two variables are hard to distinguish between when looking at fossil coral assemblages (low light levels can be from depth or turbidity of the water). Further work on the sedimentology and geology of this area would give useful data on the local conditions affecting coral growth during the Late Oligocene.

During Late Oligocene, the IWPCMB had more coral genera than the Caribbean, but less genera than the Mediterranean, however, both of the latter regions have been sampled more intensely than the IWPCMB at this time, and it is possible that there is still more generic richness to be found in the IWPCMB with further sampling. There is a large jump between Eocene and Late Oligocene generic richness levels in the IWPCMB, so further sampling of material from earlier times than this study is required to learn when this increase in diversity first began. This information shows that there is still much work to be done in order to bring the level of knowledge of the evolutionary history of the IWPCMB region in-line with that of the other two main regions of high scleractinian coral diversity. Sampling methods are important when making palaeontological collections for ecological studies, as those that do not use ecological sampling methods will not give useful/realistic measures of population diversity and abundance. Transects and timed counts are two of the methods that can be used to this end.

The timing of the IWPCMB becoming the most diverse region on the planet, as far as scleractinian reef-building corals are concerned, is from the Miocene onwards. In earlier epochs the most diverse region (generically-speaking) is the Mediterranean and Middle East region (Renema *et al.*, 2008). The scleractinian generic diversity of the Caribbean region has been high, but has been less than both the IWPCMB and Mediterranean regions during all recorded epochs (figure 9). From this work, the IWP appears to be a “Centre of Survival” for reef coral genera (Hoeksema, 2007; Wilson & Rosen, 1998), due to the low extinction levels within the region through time, and generic diversity in other regions of high coral diversity diminishing. Other mechanisms may also be at work in maintaining the high levels of generic diversity in this region (many are comprehensively listed in Rosen, 1988). Further study of these factors and of Cenozoic extinction levels in coral species, as well as genera, from all three biogeographic regions would elucidate the exact timing, and causes, of the origination of the Indo-West Pacific Centre of Marine Biodiversity.

Chapter 5:

Summary, Overall Conclusions

and Future Research

Chapter 5: Summary, Overall Conclusions and Future Research

5.1 Summary Points:

The main points that can be drawn from chapters 2-4 are summarised in this section. They will be discussed in the next section (5.2):

1) The study area consists of outcrops now attributed as part of the Labang Formation rather than the Gomantong Limestone Formation as was previously thought, and is aged between 30.78 (±0.26) Ma & 27.67 (±0.26) Ma (Te-1, NP23-25 or mid-Early to Late Oligocene).
2) The area studied contains the largest diversity of Late Oligocene corals from the Indo-West Pacific (IWP) so far found. Inclusive of at least 57 genera and approximately 100 species groups, (74 of which are described in this work), 39 of the species described may be new to science.
3) All exposures studied show a reasonable ecological similarity to one another except for Sanctuary Quarry which appears to show a difference in dominant colony growth form type (branching), likely caused by a difference in the environmental conditions at this location meaning that branching corals could survive better than at any of the other exposures.

4) The origination of high reef coral diversity in the Indo-West Pacific can be pushed back to at least the Late Oligocene, with many similar genera to those found in the area today.
5) Cenozoic scleractinian generic diversity has remained more constant through time in the IWP than in the Caribbean and Mediterranean regions, and therefore the region is likely to be a “Centre of Survival” for reef-coral genera (future study would hopefully elaborate whether this is true at species level also).
6) The Indo-West Pacific became the global biodiversity hotspot during the Miocene after extinction of some coral genera occurred in the Mediterranean.

5.2 Discussion and Conclusions:

This work has achieved accurate age dates for the reefal fossil-rich deposits of the Kinabatangan region (NE Borneo). We now know that there were a large number of corals growing within the area of the present day Indo-West Pacific centre of marine biodiversity, between approximately 31 and 27.5 Mya. The close correlation of Sr Isotopes, Nannofossils and Larger Benthic Foraminifera give a high confidence in the dating results. The muddy carbonates of this region are now attributed to the Late Oligocene, where as previously they have been dated as Early Miocene (Noad, 1998; Boudagher-Fadel *et al.*, 2000a; Noad, 2001). This age data can now be used in future studies of these fossiliferous localities.

The corals found and described in this work are predominantly zooxanthellate, and are mainly from extant genera. A number of different colony growth forms have been found, with a dominant component of platy growth forms being present overall. About 39 of the 74 described species could not be confidently attributed to a known coral species, however future study that includes comparison of these species to type specimens would probably achieve more confident results. There are still approximately 25 species groups to be described, as time restraints on this work have meant that they could not be studied. The most interesting specimens found are the two species of *Lophelia*, as they appear to be shallow water relatives of *Lophelia pertusa*, which is the only species of *Lophelia* alive today, and inhabits only cold and deep waters (Cairns and Hoeksema, 2011; Morrison et al., 2008). The evolution of this genus would be interesting to study in order to understand how corals become adapted to different oceanic environments over time. Especially when bleaching events are common in today's oceans, and are threatening the present day biodiversity of reef corals worldwide.

In the between locality exposure assessment it was noted that the sampling method used is very important when studying diversity of fossil collections. If good ecological methodology is not carried out, it can mean that diversity estimates are not realistic. Random sampling is subject to observer bias and will give an over-estimation of rare taxa. Because diversity indices such as Shannon's H and Fisher's alpha can be affected by overestimation of abundance of rare taxa, it is observed that when looking at the diversity of a given area, ecological sampling, rather than taxon-centred sampling, is a better choice. Good ecological sampling will give results that better reflect the real diversity *and* taxonomic composition of the area. Unfortunately, most collections of coral fossils have been made by the taxon-centred/random sampling method (see Chapter 4, figure 10 as an example), and because of this, ecological/timed count sampling methods may show less overall richness in a given area than random/taxon-centred sampling. This is because fewer specimens of rare species are found. This observation of a need for standardised sampling was also made by Johnson *et al*. (2007) in their work on Neogene molluscs.

The coral assemblages found in this region appear to group by taxonomic composition rather than by overall diversity, numbers of extinct/extant taxa, or by numbers of zooxanthellate/azooxanthellate taxa. The composition may be influenced by environmental variables, but without detailed sedimentology, these variables are hard to decipher. Coral growth form is not a good indicator of environmental conditions in fossil assemblages, as there are too many variables that can affect the growth form of a particular species. Examples of these variables might be: food or light availability - controlling polyp arrangement (Grauss and MacIntyre, 1976; Barnes, 1973); chemical composition and temperature of seawater – controlling calcification rates (Marubini et al. 2003; Marshall and Clode, 2004); wave and current action, biological effects (inclusive of disease, competition, predation, zooxanthellae, mutation and hybridisation), seafloor structure (hard or soft etc.) – all controlling the overall growth shape of the corallum (Chappell, 1980; Wood, 1999) . The proportional effects of these variables can be difficult to work out in modern assemblages, and it may impossible to gain any information for some of these variables from fossil assemblages (such as genetics and food availability). Until work is combined on the relative input of all of these factors, we may never be able to confidently use fossil corals as detailed environmental indicators.

So in conclusion, it can be said with confidence that the IWP had high scleractinian generic diversity before the Early Miocene, as a very diverse fauna has herein been described dating from the Late Oligocene. However the IWP region did not become the global biodiversity hotpot it is today until the Miocene epoch, after an extinction in the Mediterranean (the previous marine biodiversity hotspot; Renema *et al.*, 2008) reduced the number of Mediterranean genera present, to less than that of the IWP (Perrin and Bosellini, 2012). The origination of the hotspot in the IWP does not appear to be due to the generation of many new taxa, at least on a generic level, but is likely due to its stability of habitat suitable for reef growth. Whatever the reason, this area has not been subject to the same environmental variables that have caused extinction of reefs in other parts of the world, leaving it as the most diverse location for scleractinian coral genera in the present day.

5.3 Future Research:

Firstly, the thorough identification of the coral taxa collected, along with the identification of the other reefal organisms (gastropods, echinoids, gorgonian corals and foraminifera) that were found as part of this work is an important direction, as this may help gain more information about the depositional environment of these reefs. I plan to write up the echinoid fauna with Prof. Steve Donovan at Naturalis, Leiden later this year. I would also like to be able to officially name the novel species found in this described collection.

From undertaking the species description chapter (Chapter 3) I have found that there is very little in the literature that is a great help when working on fossil coral taxonomy. The main palaeontological reference is over 50 years old (Wells, 1956), and for the Indo-West Pacific at least many of the other palaeontological references are nearly 100 years old (Von Fritsch, 1878; Gerth, 1923, 1933; Umbgrove, 1930; 1946 and others). More work should be undertaken in the field of integrative taxonomy (the combination of fossil and genetic taxonomy) for scleractinian corals of the IWP, as they are severely lacking modern palaeontological taxonomic references. This is perhaps an area that I will follow up on in my future career, as I think that producing such work as evolutionary series of coral taxa, may be of future use to coral taxonomists, especially those working on fossil faunas.

Good sedimentology of the study area is also required. This should concentrate on the sources of sediment input into the area and the depth profiles of each of the studied sections, along with any other information about the local environmental conditions during the Late Oligocene. This would build on the work of Adams (1965; 1970; 1984) and Noad (1998; 2001), and would help to clarify what variables have allowed corals to take up residence in the IWP area in the Late Oligocene. Further study should also be made of the factors that have allowed the Indo-West Pacific region to maintain so many genera through time. As this may have implications on future studies of coral reef diversity, both in the IWP and also in the rest of the world.

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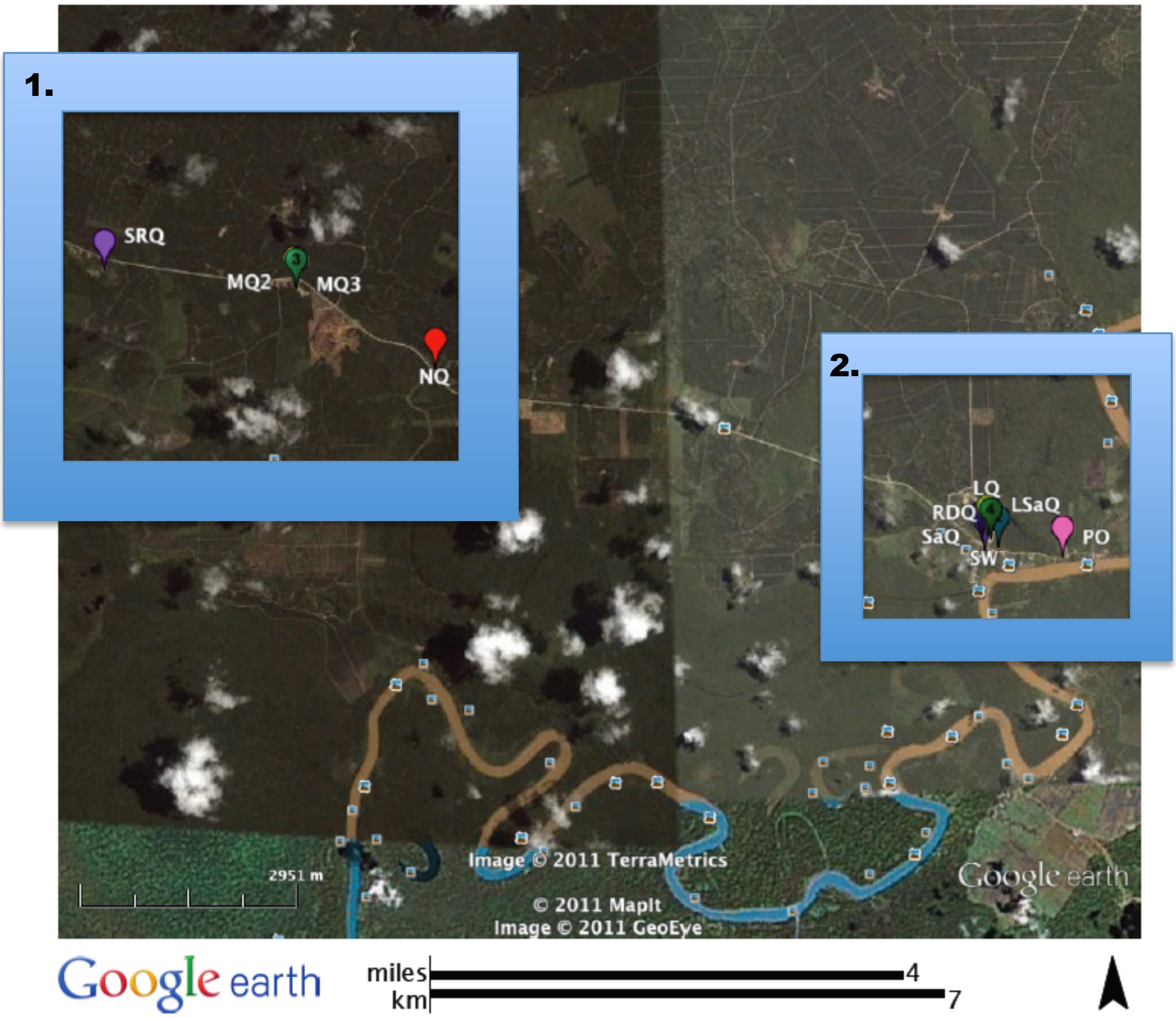
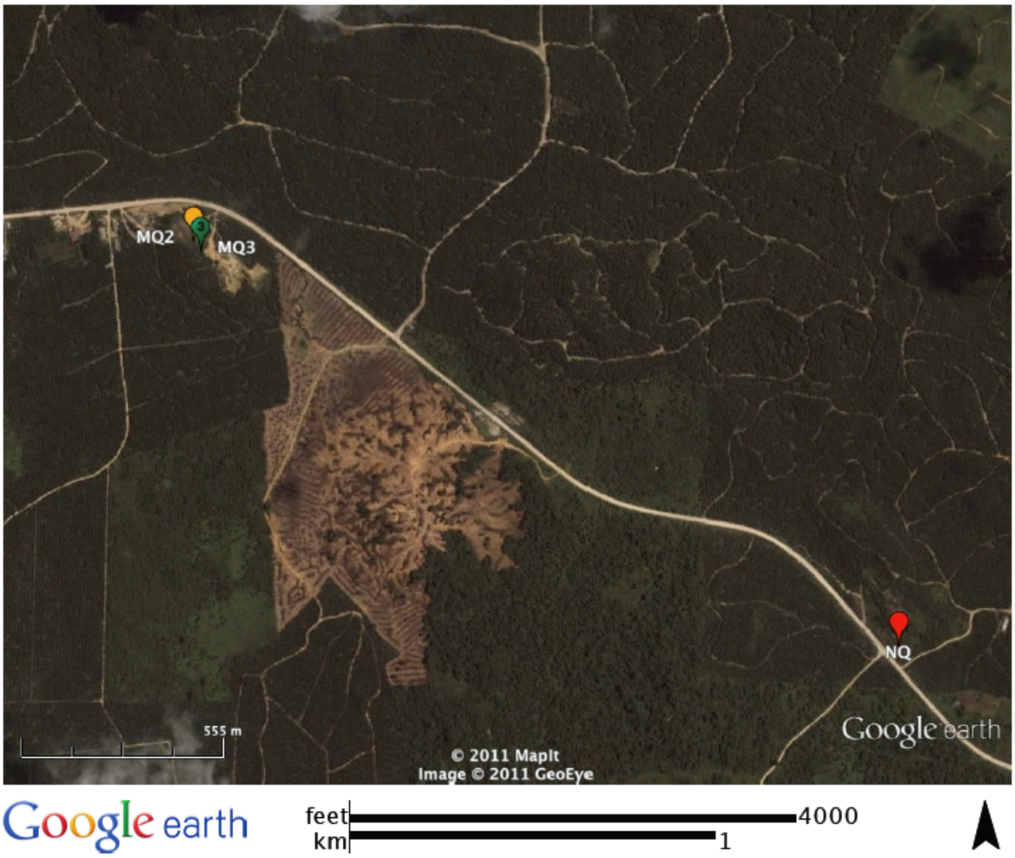
Appendix 1:

Photographs of localities

The following section contains photographs of all the localities studied in this work. The photos were taken over 2 years in 2006 and 2007. The photographers are either Robert Madden or myself. The first three pictures illustrate the proximity of the localities to one another in the Kinabatangan region, produced using Google Earth software (available freely online). Photos 1. and 2. are enlargements of areas shown in the first picture. GPS coordinates for all localities can be found in Appendix 2.



1.


MQ2
MQ3
NQ
555 m
© 2011 MapIt
Image © 2011 GeoEye
Google earth
feet
4000
km
1

2.


LQ
LSaQ
SaQ
RDQ
SW
PO
303 m
© 2011 MapIt
Image © 2011 GeoEye
Google earth
feet
2000
meters
700

Junction Quarry

Front view:

Side View:

Lake Quarry

Left Side:

Right side:

Lower Sanctuary Quarry

Main exposure:

View if standing at top right corner of previous photo, looking toward bottom left:

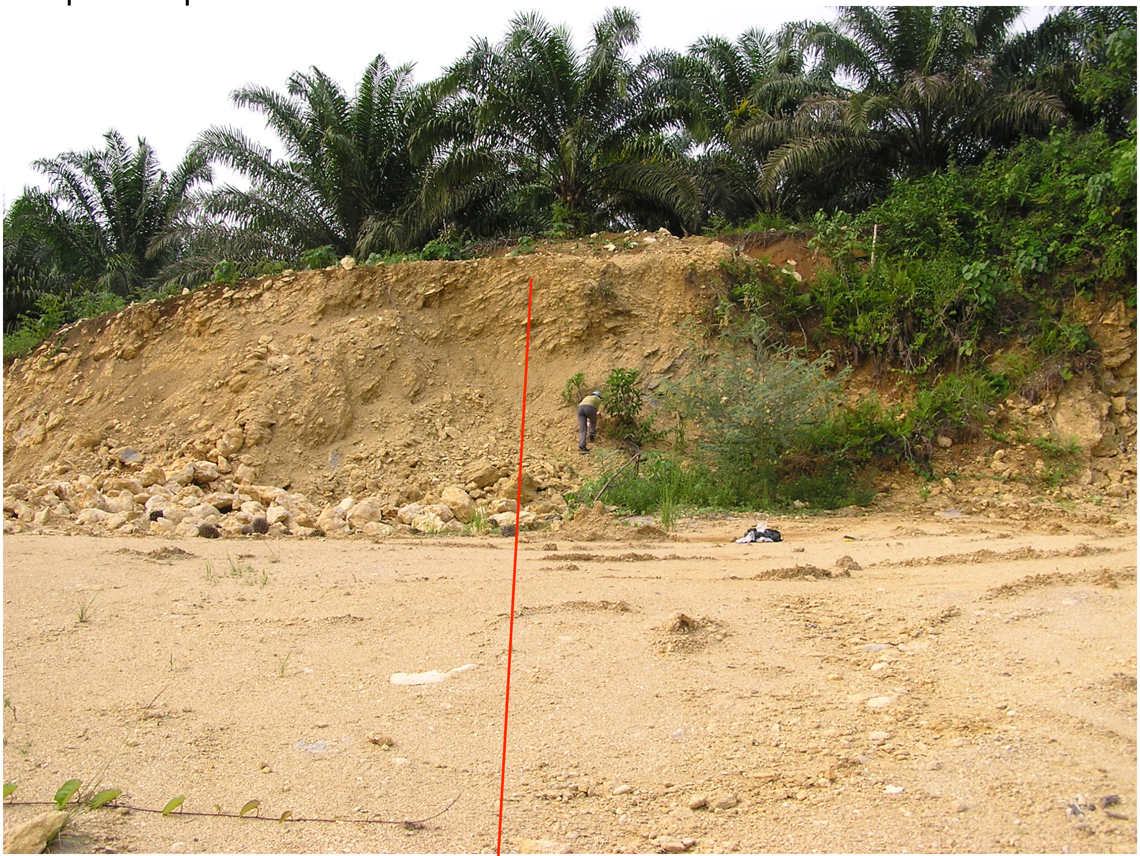
Mosque Quarry II

Left side of exposure:

Right side of exposure:

Mosque Quarry III

Complete exposure:



Close up of platy corals in situ:

Large platy coral in situ:

Neil's Quarry

Complete exposure:

Police Outcrop

Complete exposure:

Left side of exposure:

Rubbish Dump Quarry

Right side of exposure:

Sukau Road Quarry

Complete exposure:

Sanctuary Quarry:

Left side of exposure (2006):

Right side of exposure (2006):

Exposure in 2007 (note vegetation growth in foreground):

Station West Quarry:

View of locality from road:

View of locality from base of slope (M. E. J. Wilson is in same location for both photos):

Appendix 2:

Chapter 4 data tables

IRN	Prefix	Base Number	ColSubDepartment	PalRegMuseum	PalRegDepartment	PalRegRegister	PalRegBackRegistration	PalRegSubDepartment	PalRegDescription_tab	PalOthNumber_tab	PalOthTypeofNumber_tab	PalDesDescription	PalDesNumber_tab	PalDesType_tab
2477577	AZ	7452	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM__4.8.1240	LM Number	McMonagle Collection	1	Hand specimen
2477578	AZ	7453	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM__LQ: 2016	LM Number	McMonagle Collection	1	Hand specimen
2477579	AZ	7454	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.-.14 a	LM Number	McMonagle Collection	1	Hand specimen
2477580	AZ	7455	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.-.367	LM Number	McMonagle Collection	1	Hand specimen
2477581	AZ	7456	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.-.368	LM Number	McMonagle Collection	1	Hand specimen
2477582	AZ	7457	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.1	LM Number	McMonagle Collection	1	Hand specimen
2477583	AZ	7458	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.10	LM Number	McMonagle Collection	1	Hand specimen
2477584	AZ	7459	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.11	LM Number	McMonagle Collection	1	Hand specimen
2477585	AZ	7460	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.2	LM Number	McMonagle Collection	1	Hand specimen
2477586	AZ	7461	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.3	LM Number	McMonagle Collection	1	Hand specimen
2477587	AZ	7462	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.5	LM Number	McMonagle Collection	1	Hand specimen
2477588	AZ	7463	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.7	LM Number	McMonagle Collection	1	Hand specimen
2477589	AZ	7464	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.8	LM Number	McMonagle Collection	1	Hand specimen
2477590	AZ	7465	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.1.9	LM Number	McMonagle Collection	1	Hand specimen
2477591	AZ	7466	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.14	LM Number	McMonagle Collection	1	Hand specimen
2477592	AZ	7467	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.16	LM Number	McMonagle Collection	1	Hand specimen
2477593	AZ	7468	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.17	LM Number	McMonagle Collection	1	Hand specimen
2477594	AZ	7469	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.18	LM Number	McMonagle Collection	1	Hand specimen
2477595	AZ	7470	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.19	LM Number	McMonagle Collection	1	Hand specimen
2477596	AZ	7471	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.21	LM Number	McMonagle Collection	1	Hand specimen
2477597	AZ	7472	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.22	LM Number	McMonagle Collection	1	Hand specimen
2477598	AZ	7473	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.23	LM Number	McMonagle Collection	1	Hand specimen
2477599	AZ	7474	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.24	LM Number	McMonagle Collection	1	Hand specimen
2477600	AZ	7475	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.25	LM Number	McMonagle Collection	1	Hand specimen
2477601	AZ	7476	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.26	LM Number	McMonagle Collection	1	Hand specimen
2477602	AZ	7477	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.27	LM Number	McMonagle Collection	1	Hand specimen
2477603	AZ	7478	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.28	LM Number	McMonagle Collection	1	Hand specimen
2477604	AZ	7479	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.29	LM Number	McMonagle Collection	1	Hand specimen
2477605	AZ	7480	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.30	LM Number	McMonagle Collection	1	Hand specimen
2477606	AZ	7481	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.31	LM Number	McMonagle Collection	1	Hand specimen
2477607	AZ	7482	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.32	LM Number	McMonagle Collection	1	Hand specimen
2477608	AZ	7483	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.33	LM Number	McMonagle Collection	1	Hand specimen
2477609	AZ	7484	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.34 a	LM Number	McMonagle Collection	1	Hand specimen
2477610	AZ	7485	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.34 b	LM Number	McMonagle Collection	1	Hand specimen
2477611	AZ	7486	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.35	LM Number	McMonagle Collection	1	Hand specimen
2477612	AZ	7487	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.36	LM Number	McMonagle Collection	1	Hand specimen
2477613	AZ	7488	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.2.37	LM Number	McMonagle Collection	1	Hand specimen
2477614	AZ	7489	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.39	LM Number	McMonagle Collection	1	Hand specimen
2477615	AZ	7490	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.40	LM Number	McMonagle Collection	1	Hand specimen
2477616	AZ	7491	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.41	LM Number	McMonagle Collection	1	Hand specimen
2477617	AZ	7492	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.42	LM Number	McMonagle Collection	1	Hand specimen
2477618	AZ	7493	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.44	LM Number	McMonagle Collection	1	Hand specimen
2477619	AZ	7494	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.45	LM Number	McMonagle Collection	1	Hand specimen
2477620	AZ	7495	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.48	LM Number	McMonagle Collection	1	Hand specimen
2477621	AZ	7496	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.50	LM Number	McMonagle Collection	1	Hand specimen
2477622	AZ	7497	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.51	LM Number	McMonagle Collection	1	Hand specimen
2477623	AZ	7498	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.52	LM Number	McMonagle Collection	1	Hand specimen
2477624	AZ	7499	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.53	LM Number	McMonagle Collection	1	Hand specimen
2477625	AZ	7500	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.54	LM Number	McMonagle Collection	1	Hand specimen
2477626	AZ	7501	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.55	LM Number	McMonagle Collection	1	Hand specimen
2477627	AZ	7502	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.56	LM Number	McMonagle Collection	1	Hand specimen
2477628	AZ	7503	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.57	LM Number	McMonagle Collection	1	Hand specimen
2477629	AZ	7504	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.58	LM Number	McMonagle Collection	1	Hand specimen
2477630	AZ	7505	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.60	LM Number	McMonagle Collection	1	Hand specimen
2477631	AZ	7506	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.61	LM Number	McMonagle Collection	1	Hand specimen
2477632	AZ	7507	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.63	LM Number	McMonagle Collection	1	Hand specimen
2477633	AZ	7508	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.64	LM Number	McMonagle Collection	1	Hand specimen
2477634	AZ	7509	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.65	LM Number	McMonagle Collection	1	Hand specimen
2477635	AZ	7510	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.66	LM Number	McMonagle Collection	1	Hand specimen
2477636	AZ	7511	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.67	LM Number	McMonagle Collection	1	Hand specimen
2477637	AZ	7512	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.71	LM Number	McMonagle Collection	1	Hand specimen
2477638	AZ	7513	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.3.72	LM Number	McMonagle Collection	1	Hand specimen
2477639	AZ	7514	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.100	LM Number	McMonagle Collection	1	Hand specimen
2477640	AZ	7515	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.101	LM Number	McMonagle Collection	1	Hand specimen
2477641	AZ	7516	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.106	LM Number	McMonagle Collection	1	Hand specimen
2477642	AZ	7517	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.107	LM Number	McMonagle Collection	1	Hand specimen
2477643	AZ	7518	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.108	LM Number	McMonagle Collection	1	Hand specimen
2477644	AZ	7519	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.111	LM Number	McMonagle Collection	1	Hand specimen
2477645	AZ	7520	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.73 a	LM Number	McMonagle Collection	1	Hand specimen
2477646	AZ	7521	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.74	LM Number	McMonagle Collection	1	Hand specimen
2477647	AZ	7522	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.74 (b)	LM Number	McMonagle Collection	1	Hand specimen
2477648	AZ	7523	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.74 d	LM Number	McMonagle Collection	1	Hand specimen
2477649	AZ	7524	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.75	LM Number	McMonagle Collection	1	Hand specimen
2477650	AZ	7525	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.79	LM Number	McMonagle Collection	1	Hand specimen
2477651	AZ	7526	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.81	LM Number	McMonagle Collection	1	Hand specimen
2477652	AZ	7527	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.82	LM Number	McMonagle Collection	1	Hand specimen

2477653	AZ	7528	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.85	LM Number	McMonagle Collection	1	Hand specimen
2477654	AZ	7529	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.87	LM Number	McMonagle Collection	1	Hand specimen
2477655	AZ	7530	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.89	LM Number	McMonagle Collection	1	Hand specimen
2477656	AZ	7531	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.90 a	LM Number	McMonagle Collection	1	Hand specimen
2477657	AZ	7532	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.90 b	LM Number	McMonagle Collection	1	Hand specimen
2477658	AZ	7533	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.91	LM Number	McMonagle Collection	1	Hand specimen
2477659	AZ	7534	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.93	LM Number	McMonagle Collection	1	Hand specimen
2477660	AZ	7535	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.94	LM Number	McMonagle Collection	1	Hand specimen
2477661	AZ	7536	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.97	LM Number	McMonagle Collection	1	Hand specimen
2477662	AZ	7537	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.98	LM Number	McMonagle Collection	1	Hand specimen
2477663	AZ	7538	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.4.99	LM Number	McMonagle Collection	1	Hand specimen
2477664	AZ	7539	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.112	LM Number	McMonagle Collection	1	Hand specimen
2477665	AZ	7540	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.115	LM Number	McMonagle Collection	1	Hand specimen
2477666	AZ	7541	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.116	LM Number	McMonagle Collection	1	Hand specimen
2477667	AZ	7542	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.118	LM Number	McMonagle Collection	1	Hand specimen
2477668	AZ	7543	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.122	LM Number	McMonagle Collection	1	Hand specimen
2477669	AZ	7544	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.123	LM Number	McMonagle Collection	1	Hand specimen
2477670	AZ	7545	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.126	LM Number	McMonagle Collection	1	Hand specimen
2477671	AZ	7546	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.129	LM Number	McMonagle Collection	1	Hand specimen
2477672	AZ	7547	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.130	LM Number	McMonagle Collection	1	Hand specimen
2477673	AZ	7548	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.131	LM Number	McMonagle Collection	1	Hand specimen
2477674	AZ	7549	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.134	LM Number	McMonagle Collection	1	Hand specimen
2477675	AZ	7550	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.136	LM Number	McMonagle Collection	1	Hand specimen
2477676	AZ	7551	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.137	LM Number	McMonagle Collection	1	Hand specimen
2477677	AZ	7552	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.138	LM Number	McMonagle Collection	1	Hand specimen
2477678	AZ	7553	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.139	LM Number	McMonagle Collection	1	Hand specimen
2477679	AZ	7554	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.140	LM Number	McMonagle Collection	1	Hand specimen
2477680	AZ	7555	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.143	LM Number	McMonagle Collection	1	Hand specimen
2477681	AZ	7556	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.146	LM Number	McMonagle Collection	1	Hand specimen
2477682	AZ	7557	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.147	LM Number	McMonagle Collection	1	Hand specimen
2477683	AZ	7558	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.147 (b)	LM Number	McMonagle Collection	1	Hand specimen
2477684	AZ	7559	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.149	LM Number	McMonagle Collection	1	Hand specimen
2477685	AZ	7560	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.150	LM Number	McMonagle Collection	1	Hand specimen
2477686	AZ	7561	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.151	LM Number	McMonagle Collection	1	Hand specimen
2477687	AZ	7562	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.153	LM Number	McMonagle Collection	1	Hand specimen
2477688	AZ	7563	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.155	LM Number	McMonagle Collection	1	Hand specimen
2477689	AZ	7564	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.158	LM Number	McMonagle Collection	1	Hand specimen
2477690	AZ	7565	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.159	LM Number	McMonagle Collection	1	Hand specimen
2477691	AZ	7566	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.160	LM Number	McMonagle Collection	1	Hand specimen
2477692	AZ	7567	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.162	LM Number	McMonagle Collection	1	Hand specimen
2477693	AZ	7568	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.164	LM Number	McMonagle Collection	1	Hand specimen
2477694	AZ	7569	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.166	LM Number	McMonagle Collection	1	Hand specimen
2477695	AZ	7570	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.5.168	LM Number	McMonagle Collection	1	Hand specimen
2477696	AZ	7571	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.169	LM Number	McMonagle Collection	1	Hand specimen
2477697	AZ	7572	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.171	LM Number	McMonagle Collection	1	Hand specimen
2477698	AZ	7573	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.174	LM Number	McMonagle Collection	1	Hand specimen
2477699	AZ	7574	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.176	LM Number	McMonagle Collection	1	Hand specimen
2477700	AZ	7575	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.177	LM Number	McMonagle Collection	1	Hand specimen
2477701	AZ	7576	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.178	LM Number	McMonagle Collection	1	Hand specimen
2477702	AZ	7577	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.180	LM Number	McMonagle Collection	1	Hand specimen
2477703	AZ	7578	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.181	LM Number	McMonagle Collection	1	Hand specimen
2477704	AZ	7579	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.183	LM Number	McMonagle Collection	1	Hand specimen
2477705	AZ	7580	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.184	LM Number	McMonagle Collection	1	Hand specimen
2477706	AZ	7581	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.188	LM Number	McMonagle Collection	1	Hand specimen
2477707	AZ	7582	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.189	LM Number	McMonagle Collection	1	Hand specimen
2477708	AZ	7583	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.194	LM Number	McMonagle Collection	1	Hand specimen
2477709	AZ	7584	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.196	LM Number	McMonagle Collection	1	Hand specimen
2477710	AZ	7585	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.199	LM Number	McMonagle Collection	1	Hand specimen
2477711	AZ	7586	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.200	LM Number	McMonagle Collection	1	Hand specimen
2477712	AZ	7587	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.201	LM Number	McMonagle Collection	1	Hand specimen
2477713	AZ	7588	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.205	LM Number	McMonagle Collection	1	Hand specimen
2477714	AZ	7589	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.206	LM Number	McMonagle Collection	1	Hand specimen
2477715	AZ	7590	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.207	LM Number	McMonagle Collection	1	Hand specimen
2477716	AZ	7591	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.210	LM Number	McMonagle Collection	1	Hand specimen
2477717	AZ	7592	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.211	LM Number	McMonagle Collection	1	Hand specimen
2477718	AZ	7593	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.212	LM Number	McMonagle Collection	1	Hand specimen
2477719	AZ	7594	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.213	LM Number	McMonagle Collection	1	Hand specimen
2477720	AZ	7595	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.215	LM Number	McMonagle Collection	1	Hand specimen
2477721	AZ	7596	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.216	LM Number	McMonagle Collection	1	Hand specimen
2477722	AZ	7597	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.217	LM Number	McMonagle Collection	1	Hand specimen
2477723	AZ	7598	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.218	LM Number	McMonagle Collection	1	Hand specimen
2477724	AZ	7599	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.219	LM Number	McMonagle Collection	1	Hand specimen
2477725	AZ	7600	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.222	LM Number	McMonagle Collection	1	Hand specimen
2477726	AZ	7601	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.6.74 a	LM Number	McMonagle Collection	1	Hand specimen
2477727	AZ	7602	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.224	LM Number	McMonagle Collection	1	Hand specimen
2477728	AZ	7603	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.226	LM Number	McMonagle Collection	1	Hand specimen
2477729	AZ	7604	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.227	LM Number	McMonagle Collection	1	Hand specimen

2477730	AZ	7605	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.228	LM Number	McMonagle Collection	1	Hand specimen
2477731	AZ	7606	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.229	LM Number	McMonagle Collection	1	Hand specimen
2477732	AZ	7607	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.231	LM Number	McMonagle Collection	1	Hand specimen
2477733	AZ	7608	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.232	LM Number	McMonagle Collection	1	Hand specimen
2477734	AZ	7609	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.233	LM Number	McMonagle Collection	1	Hand specimen
2477735	AZ	7610	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.234	LM Number	McMonagle Collection	1	Hand specimen
2477736	AZ	7611	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.235	LM Number	McMonagle Collection	1	Hand specimen
2477737	AZ	7612	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.237	LM Number	McMonagle Collection	1	Hand specimen
2477738	AZ	7613	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.238	LM Number	McMonagle Collection	1	Hand specimen
2477739	AZ	7614	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.239	LM Number	McMonagle Collection	1	Hand specimen
2477740	AZ	7615	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.240	LM Number	McMonagle Collection	1	Hand specimen
2477741	AZ	7616	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.241	LM Number	McMonagle Collection	1	Hand specimen
2477742	AZ	7617	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.242	LM Number	McMonagle Collection	1	Hand specimen
2477743	AZ	7618	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.243 a	LM Number	McMonagle Collection	1	Hand specimen
2477744	AZ	7619	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.243 b	LM Number	McMonagle Collection	1	Hand specimen
2477745	AZ	7620	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.243 c	LM Number	McMonagle Collection	1	Hand specimen
2477746	AZ	7621	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.243 d	LM Number	McMonagle Collection	1	Hand specimen
2477747	AZ	7622	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.244	LM Number	McMonagle Collection	1	Hand specimen
2477748	AZ	7623	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.245	LM Number	McMonagle Collection	1	Hand specimen
2477749	AZ	7624	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.246	LM Number	McMonagle Collection	1	Hand specimen
2477750	AZ	7625	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.247	LM Number	McMonagle Collection	1	Hand specimen
2477751	AZ	7626	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.248	LM Number	McMonagle Collection	1	Hand specimen
2477752	AZ	7627	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.249	LM Number	McMonagle Collection	1	Hand specimen
2477753	AZ	7628	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.250	LM Number	McMonagle Collection	1	Hand specimen
2477754	AZ	7629	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.251	LM Number	McMonagle Collection	1	Hand specimen
2477755	AZ	7630	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.253	LM Number	McMonagle Collection	1	Hand specimen
2477756	AZ	7631	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.253 b	LM Number	McMonagle Collection	1	Hand specimen
2477757	AZ	7632	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.253 c	LM Number	McMonagle Collection	1	Hand specimen
2477758	AZ	7633	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.253 e	LM Number	McMonagle Collection	1	Hand specimen
2477759	AZ	7634	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.253 j	LM Number	McMonagle Collection	1	Hand specimen
2477760	AZ	7635	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.254 a	LM Number	McMonagle Collection	1	Hand specimen
2477761	AZ	7636	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.254 b	LM Number	McMonagle Collection	1	Hand specimen
2477762	AZ	7637	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.255	LM Number	McMonagle Collection	1	Hand specimen
2477763	AZ	7638	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.256	LM Number	McMonagle Collection	1	Hand specimen
2477764	AZ	7639	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.258	LM Number	McMonagle Collection	1	Hand specimen
2477765	AZ	7640	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.259	LM Number	McMonagle Collection	1	Hand specimen
2477766	AZ	7641	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.261	LM Number	McMonagle Collection	1	Hand specimen
2477767	AZ	7642	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.262	LM Number	McMonagle Collection	1	Hand specimen
2477768	AZ	7643	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.263	LM Number	McMonagle Collection	1	Hand specimen
2477769	AZ	7644	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.265	LM Number	McMonagle Collection	1	Hand specimen
2477770	AZ	7645	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.267	LM Number	McMonagle Collection	1	Hand specimen
2477771	AZ	7646	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.268	LM Number	McMonagle Collection	1	Hand specimen
2477772	AZ	7647	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.269	LM Number	McMonagle Collection	1	Hand specimen
2477773	AZ	7648	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.273	LM Number	McMonagle Collection	1	Hand specimen
2477774	AZ	7649	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.274	LM Number	McMonagle Collection	1	Hand specimen
2477775	AZ	7650	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.275	LM Number	McMonagle Collection	1	Hand specimen
2477776	AZ	7651	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.276	LM Number	McMonagle Collection	1	Hand specimen
2477777	AZ	7652	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.282	LM Number	McMonagle Collection	1	Hand specimen
2477778	AZ	7653	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.284	LM Number	McMonagle Collection	1	Hand specimen
2477779	AZ	7654	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.285	LM Number	McMonagle Collection	1	Hand specimen
2477780	AZ	7655	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.287	LM Number	McMonagle Collection	1	Hand specimen
2477781	AZ	7656	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.288	LM Number	McMonagle Collection	1	Hand specimen
2477782	AZ	7657	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.289	LM Number	McMonagle Collection	1	Hand specimen
2477783	AZ	7658	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.290	LM Number	McMonagle Collection	1	Hand specimen
2477784	AZ	7659	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.292	LM Number	McMonagle Collection	1	Hand specimen
2477785	AZ	7660	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.293	LM Number	McMonagle Collection	1	Hand specimen
2477786	AZ	7661	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.295	LM Number	McMonagle Collection	1	Hand specimen
2477787	AZ	7662	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.298	LM Number	McMonagle Collection	1	Hand specimen
2477788	AZ	7663	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.299	LM Number	McMonagle Collection	1	Hand specimen
2477789	AZ	7664	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.301	LM Number	McMonagle Collection	1	Hand specimen
2477790	AZ	7665	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.302	LM Number	McMonagle Collection	1	Hand specimen
2477791	AZ	7666	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.304	LM Number	McMonagle Collection	1	Hand specimen
2477792	AZ	7667	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.305	LM Number	McMonagle Collection	1	Hand specimen
2477793	AZ	7668	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.306	LM Number	McMonagle Collection	1	Hand specimen
2477794	AZ	7669	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.307	LM Number	McMonagle Collection	1	Hand specimen
2477795	AZ	7670	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.308	LM Number	McMonagle Collection	1	Hand specimen
2477796	AZ	7671	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.309	LM Number	McMonagle Collection	1	Hand specimen
2477797	AZ	7672	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.310	LM Number	McMonagle Collection	1	Hand specimen
2477798	AZ	7673	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.311	LM Number	McMonagle Collection	1	Hand specimen
2477799	AZ	7674	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.312	LM Number	McMonagle Collection	1	Hand specimen
2477800	AZ	7675	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.313	LM Number	McMonagle Collection	1	Hand specimen
2477801	AZ	7676	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.314	LM Number	McMonagle Collection	1	Hand specimen
2477802	AZ	7677	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.315	LM Number	McMonagle Collection	1	Hand specimen
2477803	AZ	7678	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.316	LM Number	McMonagle Collection	1	Hand specimen
2477804	AZ	7679	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.321	LM Number	McMonagle Collection	1	Hand specimen
2477805	AZ	7680	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.323	LM Number	McMonagle Collection	1	Hand specimen
2477806	AZ	7681	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.327	LM Number	McMonagle Collection	1	Hand specimen

2477807	AZ	7682	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.328	LM Number	McMonagle Collection	1	Hand specimen
2477808	AZ	7683	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.329	LM Number	McMonagle Collection	1	Hand specimen
2477809	AZ	7684	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.330	LM Number	McMonagle Collection	1	Hand specimen
2477810	AZ	7685	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.331	LM Number	McMonagle Collection	1	Hand specimen
2477811	AZ	7686	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.332	LM Number	McMonagle Collection	1	Hand specimen
2477812	AZ	7687	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.333	LM Number	McMonagle Collection	1	Hand specimen
2477813	AZ	7688	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.334	LM Number	McMonagle Collection	1	Hand specimen
2477814	AZ	7689	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.335	LM Number	McMonagle Collection	1	Hand specimen
2477815	AZ	7690	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.336 a	LM Number	McMonagle Collection	1	Hand specimen
2477816	AZ	7691	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.336 b	LM Number	McMonagle Collection	1	Hand specimen
2477817	AZ	7692	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.336 c	LM Number	McMonagle Collection	1	Hand specimen
2477818	AZ	7693	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.337 (a)	LM Number	McMonagle Collection	1	Hand specimen
2477819	AZ	7694	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.337 (b)	LM Number	McMonagle Collection	1	Hand specimen
2477820	AZ	7695	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.7.92	LM Number	McMonagle Collection	1	Hand specimen
2477821	AZ	7696	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.338	LM Number	McMonagle Collection	1	Hand specimen
2477822	AZ	7697	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.339	LM Number	McMonagle Collection	1	Hand specimen
2477823	AZ	7698	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.340	LM Number	McMonagle Collection	1	Hand specimen
2477824	AZ	7699	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.341	LM Number	McMonagle Collection	1	Hand specimen
2477825	AZ	7700	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.342	LM Number	McMonagle Collection	1	Hand specimen
2477826	AZ	7701	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.343	LM Number	McMonagle Collection	1	Hand specimen
2477827	AZ	7702	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.344	LM Number	McMonagle Collection	1	Hand specimen
2477828	AZ	7703	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.345	LM Number	McMonagle Collection	1	Hand specimen
2477829	AZ	7704	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.346 c	LM Number	McMonagle Collection	1	Hand specimen
2477830	AZ	7705	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.346 d	LM Number	McMonagle Collection	1	Hand specimen
2477831	AZ	7706	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.346 e	LM Number	McMonagle Collection	1	Hand specimen
2477832	AZ	7707	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.346 e (i)	LM Number	McMonagle Collection	1	Hand specimen
2477833	AZ	7708	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.347	LM Number	McMonagle Collection	1	Hand specimen
2477834	AZ	7709	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.348	LM Number	McMonagle Collection	1	Hand specimen
2477835	AZ	7710	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.349	LM Number	McMonagle Collection	1	Hand specimen
2477836	AZ	7711	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.350	LM Number	McMonagle Collection	1	Hand specimen
2477837	AZ	7712	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.351	LM Number	McMonagle Collection	1	Hand specimen
2477838	AZ	7713	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.353	LM Number	McMonagle Collection	1	Hand specimen
2477839	AZ	7714	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.354	LM Number	McMonagle Collection	1	Hand specimen
2477840	AZ	7715	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.355	LM Number	McMonagle Collection	1	Hand specimen
2477841	AZ	7716	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.357	LM Number	McMonagle Collection	1	Hand specimen
2477842	AZ	7717	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.358	LM Number	McMonagle Collection	1	Hand specimen
2477843	AZ	7718	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.359	LM Number	McMonagle Collection	1	Hand specimen
2477844	AZ	7719	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.361	LM Number	McMonagle Collection	1	Hand specimen
2477845	AZ	7720	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.362	LM Number	McMonagle Collection	1	Hand specimen
2477846	AZ	7721	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.363	LM Number	McMonagle Collection	1	Hand specimen
2477847	AZ	7722	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.364	LM Number	McMonagle Collection	1	Hand specimen
2477848	AZ	7723	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.365	LM Number	McMonagle Collection	1	Hand specimen
2477849	AZ	7724	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.8.552	LM Number	McMonagle Collection	1	Hand specimen
2477850	AZ	7725	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.369	LM Number	McMonagle Collection	1	Hand specimen
2477851	AZ	7726	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.373	LM Number	McMonagle Collection	1	Hand specimen
2477852	AZ	7727	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.376	LM Number	McMonagle Collection	1	Hand specimen
2477853	AZ	7728	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.380	LM Number	McMonagle Collection	1	Hand specimen
2477854	AZ	7729	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.382 c	LM Number	McMonagle Collection	1	Hand specimen
2477855	AZ	7730	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.382 d	LM Number	McMonagle Collection	1	Hand specimen
2477856	AZ	7731	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.384	LM Number	McMonagle Collection	1	Hand specimen
2477857	AZ	7732	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.385	LM Number	McMonagle Collection	1	Hand specimen
2477858	AZ	7733	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.386	LM Number	McMonagle Collection	1	Hand specimen
2477859	AZ	7734	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.387	LM Number	McMonagle Collection	1	Hand specimen
2477860	AZ	7735	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.388	LM Number	McMonagle Collection	1	Hand specimen
2477861	AZ	7736	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.390	LM Number	McMonagle Collection	1	Hand specimen
2477862	AZ	7737	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.391	LM Number	McMonagle Collection	1	Hand specimen
2477863	AZ	7738	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.392	LM Number	McMonagle Collection	1	Hand specimen
2477864	AZ	7739	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_1.9.395	LM Number	McMonagle Collection	1	Hand specimen
2477865	AZ	7740	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.-.607	LM Number	McMonagle Collection	1	Hand specimen
2477866	AZ	7741	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.393	LM Number	McMonagle Collection	1	Hand specimen
2477867	AZ	7742	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.396	LM Number	McMonagle Collection	1	Hand specimen
2477868	AZ	7743	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.398	LM Number	McMonagle Collection	1	Hand specimen
2477869	AZ	7744	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.400	LM Number	McMonagle Collection	1	Hand specimen
2477870	AZ	7745	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.403	LM Number	McMonagle Collection	1	Hand specimen
2477871	AZ	7746	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.404	LM Number	McMonagle Collection	1	Hand specimen
2477872	AZ	7747	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.405	LM Number	McMonagle Collection	1	Hand specimen
2477873	AZ	7748	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.406	LM Number	McMonagle Collection	1	Hand specimen
2477874	AZ	7749	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.408	LM Number	McMonagle Collection	1	Hand specimen
2477875	AZ	7750	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.409	LM Number	McMonagle Collection	1	Hand specimen
2477876	AZ	7751	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.410	LM Number	McMonagle Collection	1	Hand specimen
2477877	AZ	7752	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.411	LM Number	McMonagle Collection	1	Hand specimen
2477878	AZ	7753	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.412	LM Number	McMonagle Collection	1	Hand specimen
2477879	AZ	7754	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.413	LM Number	McMonagle Collection	1	Hand specimen
2477880	AZ	7755	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.415	LM Number	McMonagle Collection	1	Hand specimen
2477881	AZ	7756	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.416	LM Number	McMonagle Collection	1	Hand specimen
2477882	AZ	7757	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.417	LM Number	McMonagle Collection	1	Hand specimen
2477883	AZ	7758	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.419	LM Number	McMonagle Collection	1	Hand specimen

2477884	AZ	7759	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.420	LM Number	McMonagle Collection	1	Hand specimen
2477885	AZ	7760	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.422	LM Number	McMonagle Collection	1	Hand specimen
2477886	AZ	7761	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.422 (b)	LM Number	McMonagle Collection	1	Hand specimen
2477887	AZ	7762	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.423	LM Number	McMonagle Collection	1	Hand specimen
2477888	AZ	7763	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.424	LM Number	McMonagle Collection	1	Hand specimen
2477889	AZ	7764	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.425	LM Number	McMonagle Collection	1	Hand specimen
2477890	AZ	7765	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.426	LM Number	McMonagle Collection	1	Hand specimen
2477891	AZ	7766	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.428	LM Number	McMonagle Collection	1	Hand specimen
2477892	AZ	7767	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.429	LM Number	McMonagle Collection	1	Hand specimen
2477893	AZ	7768	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.430	LM Number	McMonagle Collection	1	Hand specimen
2477894	AZ	7769	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.433	LM Number	McMonagle Collection	1	Hand specimen
2477895	AZ	7770	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.435	LM Number	McMonagle Collection	1	Hand specimen
2477896	AZ	7771	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.436	LM Number	McMonagle Collection	1	Hand specimen
2477897	AZ	7772	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.437	LM Number	McMonagle Collection	1	Hand specimen
2477898	AZ	7773	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.439	LM Number	McMonagle Collection	1	Hand specimen
2477899	AZ	7774	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.440	LM Number	McMonagle Collection	1	Hand specimen
2477900	AZ	7775	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.441	LM Number	McMonagle Collection	1	Hand specimen
2477901	AZ	7776	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.443	LM Number	McMonagle Collection	1	Hand specimen
2477902	AZ	7777	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.445	LM Number	McMonagle Collection	1	Hand specimen
2477903	AZ	7778	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.446	LM Number	McMonagle Collection	1	Hand specimen
2477904	AZ	7779	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.447	LM Number	McMonagle Collection	1	Hand specimen
2477905	AZ	7780	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.450	LM Number	McMonagle Collection	1	Hand specimen
2477906	AZ	7781	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.451	LM Number	McMonagle Collection	1	Hand specimen
2477907	AZ	7782	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.452	LM Number	McMonagle Collection	1	Hand specimen
2477908	AZ	7783	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.456	LM Number	McMonagle Collection	1	Hand specimen
2477909	AZ	7784	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.457	LM Number	McMonagle Collection	1	Hand specimen
2477910	AZ	7785	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.459	LM Number	McMonagle Collection	1	Hand specimen
2477911	AZ	7786	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.1.460	LM Number	McMonagle Collection	1	Hand specimen
2477912	AZ	7787	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.467	LM Number	McMonagle Collection	1	Hand specimen
2477913	AZ	7788	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.468	LM Number	McMonagle Collection	1	Hand specimen
2477914	AZ	7789	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.469	LM Number	McMonagle Collection	1	Hand specimen
2477915	AZ	7790	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.470	LM Number	McMonagle Collection	1	Hand specimen
2477916	AZ	7791	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.471	LM Number	McMonagle Collection	1	Hand specimen
2477917	AZ	7792	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.473	LM Number	McMonagle Collection	1	Hand specimen
2477918	AZ	7793	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.474	LM Number	McMonagle Collection	1	Hand specimen
2477919	AZ	7794	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.475	LM Number	McMonagle Collection	1	Hand specimen
2477920	AZ	7795	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.476	LM Number	McMonagle Collection	1	Hand specimen
2477921	AZ	7796	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.484	LM Number	McMonagle Collection	1	Hand specimen
2477922	AZ	7797	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.485	LM Number	McMonagle Collection	1	Hand specimen
2477923	AZ	7798	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.2.489	LM Number	McMonagle Collection	1	Hand specimen
2477924	AZ	7799	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.479	LM Number	McMonagle Collection	1	Hand specimen
2477925	AZ	7800	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.490	LM Number	McMonagle Collection	1	Hand specimen
2477926	AZ	7801	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.491	LM Number	McMonagle Collection	1	Hand specimen
2477927	AZ	7802	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.493	LM Number	McMonagle Collection	1	Hand specimen
2477928	AZ	7803	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.494	LM Number	McMonagle Collection	1	Hand specimen
2477929	AZ	7804	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.495	LM Number	McMonagle Collection	1	Hand specimen
2477930	AZ	7805	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.496	LM Number	McMonagle Collection	1	Hand specimen
2477931	AZ	7806	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.497	LM Number	McMonagle Collection	1	Hand specimen
2477932	AZ	7807	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.501	LM Number	McMonagle Collection	1	Hand specimen
2477933	AZ	7808	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.502	LM Number	McMonagle Collection	1	Hand specimen
2477934	AZ	7809	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.504	LM Number	McMonagle Collection	1	Hand specimen
2477935	AZ	7810	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.505	LM Number	McMonagle Collection	1	Hand specimen
2477936	AZ	7811	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.506	LM Number	McMonagle Collection	1	Hand specimen
2477937	AZ	7812	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.507	LM Number	McMonagle Collection	1	Hand specimen
2477938	AZ	7813	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.3.508	LM Number	McMonagle Collection	1	Hand specimen
2477939	AZ	7814	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.519	LM Number	McMonagle Collection	1	Hand specimen
2477940	AZ	7815	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.520	LM Number	McMonagle Collection	1	Hand specimen
2477941	AZ	7816	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.521	LM Number	McMonagle Collection	1	Hand specimen
2477942	AZ	7817	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.522	LM Number	McMonagle Collection	1	Hand specimen
2477943	AZ	7818	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.523	LM Number	McMonagle Collection	1	Hand specimen
2477944	AZ	7819	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.524	LM Number	McMonagle Collection	1	Hand specimen
2477945	AZ	7820	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.525	LM Number	McMonagle Collection	1	Hand specimen
2477946	AZ	7821	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.526	LM Number	McMonagle Collection	1	Hand specimen
2477947	AZ	7822	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.527	LM Number	McMonagle Collection	1	Hand specimen
2477948	AZ	7823	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.528	LM Number	McMonagle Collection	1	Hand specimen
2477949	AZ	7824	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.529	LM Number	McMonagle Collection	1	Hand specimen
2477950	AZ	7825	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.531	LM Number	McMonagle Collection	1	Hand specimen
2477951	AZ	7826	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.532	LM Number	McMonagle Collection	1	Hand specimen
2477952	AZ	7827	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.533	LM Number	McMonagle Collection	1	Hand specimen
2477953	AZ	7828	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.534	LM Number	McMonagle Collection	1	Hand specimen
2477954	AZ	7829	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.535	LM Number	McMonagle Collection	1	Hand specimen
2477955	AZ	7830	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.536	LM Number	McMonagle Collection	1	Hand specimen
2477956	AZ	7831	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.536	LM Number	McMonagle Collection	1	Hand specimen
2477957	AZ	7832	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.537	LM Number	McMonagle Collection	1	Hand specimen
2477958	AZ	7833	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.538	LM Number	McMonagle Collection	1	Hand specimen
2477959	AZ	7834	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.541	LM Number	McMonagle Collection	1	Hand specimen
2477960	AZ	7835	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.543	LM Number	McMonagle Collection	1	Hand specimen

2477961	AZ	7836	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.4.544	LM Number	McMonagle Collection	1	Hand specimen
2477962	AZ	7837	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.545	LM Number	McMonagle Collection	1	Hand specimen
2477963	AZ	7838	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.547	LM Number	McMonagle Collection	1	Hand specimen
2477964	AZ	7839	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.549	LM Number	McMonagle Collection	1	Hand specimen
2477965	AZ	7840	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.550	LM Number	McMonagle Collection	1	Hand specimen
2477966	AZ	7841	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.551	LM Number	McMonagle Collection	1	Hand specimen
2477967	AZ	7842	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.552	LM Number	McMonagle Collection	1	Hand specimen
2477968	AZ	7843	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.553	LM Number	McMonagle Collection	1	Hand specimen
2477969	AZ	7844	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.554	LM Number	McMonagle Collection	1	Hand specimen
2477970	AZ	7845	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.555 b	LM Number	McMonagle Collection	1	Hand specimen
2477971	AZ	7846	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.5.560	LM Number	McMonagle Collection	1	Hand specimen
2477972	AZ	7847	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.561	LM Number	McMonagle Collection	1	Hand specimen
2477973	AZ	7848	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.562	LM Number	McMonagle Collection	1	Hand specimen
2477974	AZ	7849	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.565	LM Number	McMonagle Collection	1	Hand specimen
2477975	AZ	7850	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.566	LM Number	McMonagle Collection	1	Hand specimen
2477976	AZ	7851	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.568	LM Number	McMonagle Collection	1	Hand specimen
2477977	AZ	7852	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.571	LM Number	McMonagle Collection	1	Hand specimen
2477978	AZ	7853	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.578	LM Number	McMonagle Collection	1	Hand specimen
2477979	AZ	7854	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.579	LM Number	McMonagle Collection	1	Hand specimen
2477980	AZ	7855	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.6.580	LM Number	McMonagle Collection	1	Hand specimen
2477981	AZ	7856	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.582	LM Number	McMonagle Collection	1	Hand specimen
2477982	AZ	7857	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.583	LM Number	McMonagle Collection	1	Hand specimen
2477983	AZ	7858	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.584	LM Number	McMonagle Collection	1	Hand specimen
2477984	AZ	7859	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.586	LM Number	McMonagle Collection	1	Hand specimen
2477985	AZ	7860	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.587	LM Number	McMonagle Collection	1	Hand specimen
2477986	AZ	7861	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.588	LM Number	McMonagle Collection	1	Hand specimen
2477987	AZ	7862	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.590	LM Number	McMonagle Collection	1	Hand specimen
2477988	AZ	7863	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.592	LM Number	McMonagle Collection	1	Hand specimen
2477989	AZ	7864	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.594	LM Number	McMonagle Collection	1	Hand specimen
2477990	AZ	7865	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.597	LM Number	McMonagle Collection	1	Hand specimen
2477991	AZ	7866	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.598	LM Number	McMonagle Collection	1	Hand specimen
2477992	AZ	7867	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.599	LM Number	McMonagle Collection	1	Hand specimen
2477993	AZ	7868	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.600	LM Number	McMonagle Collection	1	Hand specimen
2477994	AZ	7869	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.601	LM Number	McMonagle Collection	1	Hand specimen
2477995	AZ	7870	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.603	LM Number	McMonagle Collection	1	Hand specimen
2477996	AZ	7871	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.604	LM Number	McMonagle Collection	1	Hand specimen
2477997	AZ	7872	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_2.7.605	LM Number	McMonagle Collection	1	Hand specimen
2477998	AZ	7873	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.617	LM Number	McMonagle Collection	1	Hand specimen
2477999	AZ	7874	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.635	LM Number	McMonagle Collection	1	Hand specimen
2478000	AZ	7875	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.636	LM Number	McMonagle Collection	1	Hand specimen
2478001	AZ	7876	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.650	LM Number	McMonagle Collection	1	Hand specimen
2478002	AZ	7877	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.652	LM Number	McMonagle Collection	1	Hand specimen
2478003	AZ	7878	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.658	LM Number	McMonagle Collection	1	Hand specimen
2478004	AZ	7879	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.659	LM Number	McMonagle Collection	1	Hand specimen
2478005	AZ	7880	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.663	LM Number	McMonagle Collection	1	Hand specimen
2478006	AZ	7881	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.665	LM Number	McMonagle Collection	1	Hand specimen
2478007	AZ	7882	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.666	LM Number	McMonagle Collection	1	Hand specimen
2478008	AZ	7883	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.668	LM Number	McMonagle Collection	1	Hand specimen
2478009	AZ	7884	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.670	LM Number	McMonagle Collection	1	Hand specimen
2478010	AZ	7885	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.671	LM Number	McMonagle Collection	1	Hand specimen
2478011	AZ	7886	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.1.672	LM Number	McMonagle Collection	1	Hand specimen
2478012	AZ	7887	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.674	LM Number	McMonagle Collection	1	Hand specimen
2478013	AZ	7888	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.681	LM Number	McMonagle Collection	1	Hand specimen
2478014	AZ	7889	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.682	LM Number	McMonagle Collection	1	Hand specimen
2478015	AZ	7890	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.685	LM Number	McMonagle Collection	1	Hand specimen
2478016	AZ	7891	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.690	LM Number	McMonagle Collection	1	Hand specimen
2478017	AZ	7892	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.694	LM Number	McMonagle Collection	1	Hand specimen
2478018	AZ	7893	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.696	LM Number	McMonagle Collection	1	Hand specimen
2478019	AZ	7894	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.697	LM Number	McMonagle Collection	1	Hand specimen
2478020	AZ	7895	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.698	LM Number	McMonagle Collection	1	Hand specimen
2478021	AZ	7896	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.700	LM Number	McMonagle Collection	1	Hand specimen
2478022	AZ	7897	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.705	LM Number	McMonagle Collection	1	Hand specimen
2478023	AZ	7898	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.706	LM Number	McMonagle Collection	1	Hand specimen
2478024	AZ	7899	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.708	LM Number	McMonagle Collection	1	Hand specimen
2478025	AZ	7900	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.714	LM Number	McMonagle Collection	1	Hand specimen
2478026	AZ	7901	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.715	LM Number	McMonagle Collection	1	Hand specimen
2478027	AZ	7902	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.717	LM Number	McMonagle Collection	1	Hand specimen
2478028	AZ	7903	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.2.719	LM Number	McMonagle Collection	1	Hand specimen
2478029	AZ	7904	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.735	LM Number	McMonagle Collection	1	Hand specimen
2478030	AZ	7905	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.744	LM Number	McMonagle Collection	1	Hand specimen
2478031	AZ	7906	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.745	LM Number	McMonagle Collection	1	Hand specimen
2478032	AZ	7907	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.747	LM Number	McMonagle Collection	1	Hand specimen
2478033	AZ	7908	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.749	LM Number	McMonagle Collection	1	Hand specimen
2478034	AZ	7909	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.754	LM Number	McMonagle Collection	1	Hand specimen
2478035	AZ	7910	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.755	LM Number	McMonagle Collection	1	Hand specimen
2478036	AZ	7911	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.758	LM Number	McMonagle Collection	1	Hand specimen
2478037	AZ	7912	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.3.762	LM Number	McMonagle Collection	1	Hand specimen

2478038	AZ	7913	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.764	LM Number	McMonagle Collection	1	Hand specimen
2478039	AZ	7914	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.766	LM Number	McMonagle Collection	1	Hand specimen
2478040	AZ	7915	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.768	LM Number	McMonagle Collection	1	Hand specimen
2478041	AZ	7916	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.769	LM Number	McMonagle Collection	1	Hand specimen
2478042	AZ	7917	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.771	LM Number	McMonagle Collection	1	Hand specimen
2478043	AZ	7918	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.774	LM Number	McMonagle Collection	1	Hand specimen
2478044	AZ	7919	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.4.777	LM Number	McMonagle Collection	1	Hand specimen
2478045	AZ	7920	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.5.787	LM Number	McMonagle Collection	1	Hand specimen
2478046	AZ	7921	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.5.790	LM Number	McMonagle Collection	1	Hand specimen
2478047	AZ	7922	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.5.791	LM Number	McMonagle Collection	1	Hand specimen
2478048	AZ	7923	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.5.792	LM Number	McMonagle Collection	1	Hand specimen
2478049	AZ	7924	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.5.795	LM Number	McMonagle Collection	1	Hand specimen
2478050	AZ	7925	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.806	LM Number	McMonagle Collection	1	Hand specimen
2478051	AZ	7926	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.807	LM Number	McMonagle Collection	1	Hand specimen
2478052	AZ	7927	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.821	LM Number	McMonagle Collection	1	Hand specimen
2478053	AZ	7928	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.822	LM Number	McMonagle Collection	1	Hand specimen
2478054	AZ	7929	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.824	LM Number	McMonagle Collection	1	Hand specimen
2478055	AZ	7930	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.825	LM Number	McMonagle Collection	1	Hand specimen
2478056	AZ	7931	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.827	LM Number	McMonagle Collection	1	Hand specimen
2478057	AZ	7932	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.828	LM Number	McMonagle Collection	1	Hand specimen
2478058	AZ	7933	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_3.6.829	LM Number	McMonagle Collection	1	Hand specimen
2478059	AZ	7934	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1 866	LM Number	McMonagle Collection	1	Hand specimen
2478060	AZ	7935	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.831 a	LM Number	McMonagle Collection	1	Hand specimen
2478061	AZ	7936	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.831 b	LM Number	McMonagle Collection	1	Hand specimen
2478062	AZ	7937	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.833	LM Number	McMonagle Collection	1	Hand specimen
2478063	AZ	7938	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.834	LM Number	McMonagle Collection	1	Hand specimen
2478064	AZ	7939	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.835	LM Number	McMonagle Collection	1	Hand specimen
2478065	AZ	7940	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.836	LM Number	McMonagle Collection	1	Hand specimen
2478066	AZ	7941	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.838	LM Number	McMonagle Collection	1	Hand specimen
2478067	AZ	7942	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.839	LM Number	McMonagle Collection	1	Hand specimen
2478068	AZ	7943	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.840	LM Number	McMonagle Collection	1	Hand specimen
2478069	AZ	7944	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.841	LM Number	McMonagle Collection	1	Hand specimen
2478070	AZ	7945	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.842	LM Number	McMonagle Collection	1	Hand specimen
2478071	AZ	7946	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.843	LM Number	McMonagle Collection	1	Hand specimen
2478072	AZ	7947	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.845	LM Number	McMonagle Collection	1	Hand specimen
2478073	AZ	7948	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.846	LM Number	McMonagle Collection	1	Hand specimen
2478074	AZ	7949	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.847	LM Number	McMonagle Collection	1	Hand specimen
2478075	AZ	7950	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.849	LM Number	McMonagle Collection	1	Hand specimen
2478076	AZ	7951	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.850	LM Number	McMonagle Collection	1	Hand specimen
2478077	AZ	7952	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.851	LM Number	McMonagle Collection	1	Hand specimen
2478078	AZ	7953	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.852	LM Number	McMonagle Collection	1	Hand specimen
2478079	AZ	7954	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.853	LM Number	McMonagle Collection	1	Hand specimen
2478080	AZ	7955	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.854	LM Number	McMonagle Collection	1	Hand specimen
2478081	AZ	7956	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.855	LM Number	McMonagle Collection	1	Hand specimen
2478082	AZ	7957	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.856	LM Number	McMonagle Collection	1	Hand specimen
2478083	AZ	7958	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.857	LM Number	McMonagle Collection	1	Hand specimen
2478084	AZ	7959	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.858	LM Number	McMonagle Collection	1	Hand specimen
2478085	AZ	7960	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.859 (c)(ii)	LM Number	McMonagle Collection	1	Hand specimen
2478086	AZ	7961	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.859 (b)	LM Number	McMonagle Collection	1	Hand specimen
2478087	AZ	7962	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.859 a (i)	LM Number	McMonagle Collection	1	Hand specimen
2478088	AZ	7963	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.859 c (i)	LM Number	McMonagle Collection	1	Hand specimen
2478089	AZ	7964	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.861	LM Number	McMonagle Collection	1	Hand specimen
2478090	AZ	7965	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.862	LM Number	McMonagle Collection	1	Hand specimen
2478091	AZ	7966	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.864	LM Number	McMonagle Collection	1	Hand specimen
2478092	AZ	7967	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.867	LM Number	McMonagle Collection	1	Hand specimen
2478093	AZ	7968	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.868	LM Number	McMonagle Collection	1	Hand specimen
2478094	AZ	7969	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.869	LM Number	McMonagle Collection	1	Hand specimen
2478095	AZ	7970	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.870	LM Number	McMonagle Collection	1	Hand specimen
2478096	AZ	7971	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.871	LM Number	McMonagle Collection	1	Hand specimen
2478097	AZ	7972	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.873	LM Number	McMonagle Collection	1	Hand specimen
2478098	AZ	7973	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.874	LM Number	McMonagle Collection	1	Hand specimen
2478099	AZ	7974	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.876	LM Number	McMonagle Collection	1	Hand specimen
2478100	AZ	7975	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.877	LM Number	McMonagle Collection	1	Hand specimen
2478101	AZ	7976	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.878	LM Number	McMonagle Collection	1	Hand specimen
2478102	AZ	7977	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.879	LM Number	McMonagle Collection	1	Hand specimen
2478103	AZ	7978	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.1.880	LM Number	McMonagle Collection	1	Hand specimen
2478104	AZ	7979	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.1010	LM Number	McMonagle Collection	1	Hand specimen
2478105	AZ	7980	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.1152	LM Number	McMonagle Collection	1	Hand specimen
2478106	AZ	7981	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.1287	LM Number	McMonagle Collection	1	Hand specimen
2478107	AZ	7982	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.881	LM Number	McMonagle Collection	1	Hand specimen
2478108	AZ	7983	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.882	LM Number	McMonagle Collection	1	Hand specimen
2478109	AZ	7984	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.884	LM Number	McMonagle Collection	1	Hand specimen
2478110	AZ	7985	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.886	LM Number	McMonagle Collection	1	Hand specimen
2478111	AZ	7986	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.887	LM Number	McMonagle Collection	1	Hand specimen
2478112	AZ	7987	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.888	LM Number	McMonagle Collection	1	Hand specimen
2478113	AZ	7988	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.889	LM Number	McMonagle Collection	1	Hand specimen
2478114	AZ	7989	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.890	LM Number	McMonagle Collection	1	Hand specimen

2478115	AZ	7990	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.891	LM Number	McMonagle Collection	1	Hand specimen
2478116	AZ	7991	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.892	LM Number	McMonagle Collection	1	Hand specimen
2478117	AZ	7992	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.893	LM Number	McMonagle Collection	1	Hand specimen
2478118	AZ	7993	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.894	LM Number	McMonagle Collection	1	Hand specimen
2478119	AZ	7994	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.895	LM Number	McMonagle Collection	1	Hand specimen
2478120	AZ	7995	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.897	LM Number	McMonagle Collection	1	Hand specimen
2478121	AZ	7996	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.899	LM Number	McMonagle Collection	1	Hand specimen
2478122	AZ	7997	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.900	LM Number	McMonagle Collection	1	Hand specimen
2478123	AZ	7998	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.904	LM Number	McMonagle Collection	1	Hand specimen
2478124	AZ	7999	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.904 b	LM Number	McMonagle Collection	1	Hand specimen
2478125	AZ	8000	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.905	LM Number	McMonagle Collection	1	Hand specimen
2478126	AZ	8001	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.906	LM Number	McMonagle Collection	1	Hand specimen
2478127	AZ	8002	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.907	LM Number	McMonagle Collection	1	Hand specimen
2478128	AZ	8003	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.909	LM Number	McMonagle Collection	1	Hand specimen
2478129	AZ	8004	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.910	LM Number	McMonagle Collection	1	Hand specimen
2478130	AZ	8005	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.912	LM Number	McMonagle Collection	1	Hand specimen
2478131	AZ	8006	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.913	LM Number	McMonagle Collection	1	Hand specimen
2478132	AZ	8007	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.914	LM Number	McMonagle Collection	1	Hand specimen
2478133	AZ	8008	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.915	LM Number	McMonagle Collection	1	Hand specimen
2478134	AZ	8009	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.916	LM Number	McMonagle Collection	1	Hand specimen
2478135	AZ	8010	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.917 c	LM Number	McMonagle Collection	1	Hand specimen
2478136	AZ	8011	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.917 d	LM Number	McMonagle Collection	1	Hand specimen
2478137	AZ	8012	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.917 f	LM Number	McMonagle Collection	1	Hand specimen
2478138	AZ	8013	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.917 i	LM Number	McMonagle Collection	1	Hand specimen
2478139	AZ	8014	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.920	LM Number	McMonagle Collection	1	Hand specimen
2478140	AZ	8015	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.922	LM Number	McMonagle Collection	1	Hand specimen
2478141	AZ	8016	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.923	LM Number	McMonagle Collection	1	Hand specimen
2478142	AZ	8017	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.924	LM Number	McMonagle Collection	1	Hand specimen
2478143	AZ	8018	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.925	LM Number	McMonagle Collection	1	Hand specimen
2478144	AZ	8019	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.927	LM Number	McMonagle Collection	1	Hand specimen
2478145	AZ	8020	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.928	LM Number	McMonagle Collection	1	Hand specimen
2478146	AZ	8021	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.929	LM Number	McMonagle Collection	1	Hand specimen
2478147	AZ	8022	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.930	LM Number	McMonagle Collection	1	Hand specimen
2478148	AZ	8023	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.932	LM Number	McMonagle Collection	1	Hand specimen
2478149	AZ	8024	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.934	LM Number	McMonagle Collection	1	Hand specimen
2478150	AZ	8025	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.2.935	LM Number	McMonagle Collection	1	Hand specimen
2478151	AZ	8026	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1000	LM Number	McMonagle Collection	1	Hand specimen
2478152	AZ	8027	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1001	LM Number	McMonagle Collection	1	Hand specimen
2478153	AZ	8028	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1002	LM Number	McMonagle Collection	1	Hand specimen
2478154	AZ	8029	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1003	LM Number	McMonagle Collection	1	Hand specimen
2478155	AZ	8030	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1004	LM Number	McMonagle Collection	1	Hand specimen
2478156	AZ	8031	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1007	LM Number	McMonagle Collection	1	Hand specimen
2478157	AZ	8032	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1008	LM Number	McMonagle Collection	1	Hand specimen
2478158	AZ	8033	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1009	LM Number	McMonagle Collection	1	Hand specimen
2478159	AZ	8034	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1011	LM Number	McMonagle Collection	1	Hand specimen
2478160	AZ	8035	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1012	LM Number	McMonagle Collection	1	Hand specimen
2478161	AZ	8036	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1013	LM Number	McMonagle Collection	1	Hand specimen
2478162	AZ	8037	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1014	LM Number	McMonagle Collection	1	Hand specimen
2478163	AZ	8038	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1015	LM Number	McMonagle Collection	1	Hand specimen
2478164	AZ	8039	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1016	LM Number	McMonagle Collection	1	Hand specimen
2478165	AZ	8040	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1017	LM Number	McMonagle Collection	1	Hand specimen
2478166	AZ	8041	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1018	LM Number	McMonagle Collection	1	Hand specimen
2478167	AZ	8042	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1019	LM Number	McMonagle Collection	1	Hand specimen
2478168	AZ	8043	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1020	LM Number	McMonagle Collection	1	Hand specimen
2478169	AZ	8044	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 a	LM Number	McMonagle Collection	1	Hand specimen
2478170	AZ	8045	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 b	LM Number	McMonagle Collection	1	Hand specimen
2478171	AZ	8046	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 c	LM Number	McMonagle Collection	1	Hand specimen
2478172	AZ	8047	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 c (i)	LM Number	McMonagle Collection	1	Hand specimen
2478173	AZ	8048	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 c (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478174	AZ	8049	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 d	LM Number	McMonagle Collection	1	Hand specimen
2478175	AZ	8050	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.1022 g	LM Number	McMonagle Collection	1	Hand specimen
2478176	AZ	8051	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.936	LM Number	McMonagle Collection	1	Hand specimen
2478177	AZ	8052	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.937	LM Number	McMonagle Collection	1	Hand specimen
2478178	AZ	8053	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.938	LM Number	McMonagle Collection	1	Hand specimen
2478179	AZ	8054	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.940	LM Number	McMonagle Collection	1	Hand specimen
2478180	AZ	8055	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.941	LM Number	McMonagle Collection	1	Hand specimen
2478181	AZ	8056	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.942	LM Number	McMonagle Collection	1	Hand specimen
2478182	AZ	8057	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.943	LM Number	McMonagle Collection	1	Hand specimen
2478183	AZ	8058	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.945	LM Number	McMonagle Collection	1	Hand specimen
2478184	AZ	8059	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.946	LM Number	McMonagle Collection	1	Hand specimen
2478185	AZ	8060	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.948	LM Number	McMonagle Collection	1	Hand specimen
2478186	AZ	8061	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.949	LM Number	McMonagle Collection	1	Hand specimen
2478187	AZ	8062	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.952	LM Number	McMonagle Collection	1	Hand specimen
2478188	AZ	8063	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.953	LM Number	McMonagle Collection	1	Hand specimen
2478189	AZ	8064	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.954	LM Number	McMonagle Collection	1	Hand specimen
2478190	AZ	8065	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.956	LM Number	McMonagle Collection	1	Hand specimen
2478191	AZ	8066	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.957	LM Number	McMonagle Collection	1	Hand specimen

2478192	AZ	8067	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.959	LM Number	McMonagle Collection	1	Hand specimen
2478193	AZ	8068	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.960	LM Number	McMonagle Collection	1	Hand specimen
2478194	AZ	8069	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.963	LM Number	McMonagle Collection	1	Hand specimen
2478195	AZ	8070	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.964	LM Number	McMonagle Collection	1	Hand specimen
2478196	AZ	8071	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.965	LM Number	McMonagle Collection	1	Hand specimen
2478197	AZ	8072	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.966	LM Number	McMonagle Collection	1	Hand specimen
2478198	AZ	8073	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.967	LM Number	McMonagle Collection	1	Hand specimen
2478199	AZ	8074	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.968	LM Number	McMonagle Collection	1	Hand specimen
2478200	AZ	8075	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.969	LM Number	McMonagle Collection	1	Hand specimen
2478201	AZ	8076	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.970	LM Number	McMonagle Collection	1	Hand specimen
2478202	AZ	8077	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.971	LM Number	McMonagle Collection	1	Hand specimen
2478203	AZ	8078	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.972	LM Number	McMonagle Collection	1	Hand specimen
2478204	AZ	8079	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.973	LM Number	McMonagle Collection	1	Hand specimen
2478205	AZ	8080	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.974	LM Number	McMonagle Collection	1	Hand specimen
2478206	AZ	8081	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.976	LM Number	McMonagle Collection	1	Hand specimen
2478207	AZ	8082	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.978	LM Number	McMonagle Collection	1	Hand specimen
2478208	AZ	8083	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.980	LM Number	McMonagle Collection	1	Hand specimen
2478209	AZ	8084	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.981	LM Number	McMonagle Collection	1	Hand specimen
2478210	AZ	8085	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.982	LM Number	McMonagle Collection	1	Hand specimen
2478211	AZ	8086	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.985	LM Number	McMonagle Collection	1	Hand specimen
2478212	AZ	8087	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.986	LM Number	McMonagle Collection	1	Hand specimen
2478213	AZ	8088	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.987	LM Number	McMonagle Collection	1	Hand specimen
2478214	AZ	8089	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.988	LM Number	McMonagle Collection	1	Hand specimen
2478215	AZ	8090	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.989	LM Number	McMonagle Collection	1	Hand specimen
2478216	AZ	8091	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.990	LM Number	McMonagle Collection	1	Hand specimen
2478217	AZ	8092	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.991	LM Number	McMonagle Collection	1	Hand specimen
2478218	AZ	8093	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.992	LM Number	McMonagle Collection	1	Hand specimen
2478219	AZ	8094	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.994	LM Number	McMonagle Collection	1	Hand specimen
2478220	AZ	8095	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.995	LM Number	McMonagle Collection	1	Hand specimen
2478221	AZ	8096	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.996	LM Number	McMonagle Collection	1	Hand specimen
2478222	AZ	8097	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.997	LM Number	McMonagle Collection	1	Hand specimen
2478223	AZ	8098	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.3.998	LM Number	McMonagle Collection	1	Hand specimen
2478224	AZ	8099	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1025	LM Number	McMonagle Collection	1	Hand specimen
2478225	AZ	8100	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1026	LM Number	McMonagle Collection	1	Hand specimen
2478226	AZ	8101	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1028	LM Number	McMonagle Collection	1	Hand specimen
2478227	AZ	8102	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1029	LM Number	McMonagle Collection	1	Hand specimen
2478228	AZ	8103	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1030	LM Number	McMonagle Collection	1	Hand specimen
2478229	AZ	8104	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1031	LM Number	McMonagle Collection	1	Hand specimen
2478230	AZ	8105	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1033	LM Number	McMonagle Collection	1	Hand specimen
2478231	AZ	8106	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1034	LM Number	McMonagle Collection	1	Hand specimen
2478232	AZ	8107	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1036	LM Number	McMonagle Collection	1	Hand specimen
2478233	AZ	8108	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1037	LM Number	McMonagle Collection	1	Hand specimen
2478234	AZ	8109	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1039	LM Number	McMonagle Collection	1	Hand specimen
2478235	AZ	8110	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1042	LM Number	McMonagle Collection	1	Hand specimen
2478236	AZ	8111	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1043	LM Number	McMonagle Collection	1	Hand specimen
2478237	AZ	8112	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1044	LM Number	McMonagle Collection	1	Hand specimen
2478238	AZ	8113	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1045	LM Number	McMonagle Collection	1	Hand specimen
2478239	AZ	8114	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1046	LM Number	McMonagle Collection	1	Hand specimen
2478240	AZ	8115	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1047	LM Number	McMonagle Collection	1	Hand specimen
2478241	AZ	8116	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1048	LM Number	McMonagle Collection	1	Hand specimen
2478242	AZ	8117	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1055	LM Number	McMonagle Collection	1	Hand specimen
2478243	AZ	8118	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.4.1055 b	LM Number	McMonagle Collection	1	Hand specimen
2478244	AZ	8119	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1027	LM Number	McMonagle Collection	1	Hand specimen
2478245	AZ	8120	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1056	LM Number	McMonagle Collection	1	Hand specimen
2478246	AZ	8121	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1059	LM Number	McMonagle Collection	1	Hand specimen
2478247	AZ	8122	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1060	LM Number	McMonagle Collection	1	Hand specimen
2478248	AZ	8123	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1062	LM Number	McMonagle Collection	1	Hand specimen
2478249	AZ	8124	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1063	LM Number	McMonagle Collection	1	Hand specimen
2478250	AZ	8125	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1064	LM Number	McMonagle Collection	1	Hand specimen
2478251	AZ	8126	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1065	LM Number	McMonagle Collection	1	Hand specimen
2478252	AZ	8127	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1066	LM Number	McMonagle Collection	1	Hand specimen
2478253	AZ	8128	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1068	LM Number	McMonagle Collection	1	Hand specimen
2478254	AZ	8129	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1069	LM Number	McMonagle Collection	1	Hand specimen
2478255	AZ	8130	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1070	LM Number	McMonagle Collection	1	Hand specimen
2478256	AZ	8131	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1071	LM Number	McMonagle Collection	1	Hand specimen
2478257	AZ	8132	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1073	LM Number	McMonagle Collection	1	Hand specimen
2478258	AZ	8133	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1074	LM Number	McMonagle Collection	1	Hand specimen
2478259	AZ	8134	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1075	LM Number	McMonagle Collection	1	Hand specimen
2478260	AZ	8135	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1076	LM Number	McMonagle Collection	1	Hand specimen
2478261	AZ	8136	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1077	LM Number	McMonagle Collection	1	Hand specimen
2478262	AZ	8137	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1078	LM Number	McMonagle Collection	1	Hand specimen
2478263	AZ	8138	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1080	LM Number	McMonagle Collection	1	Hand specimen
2478264	AZ	8139	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1081	LM Number	McMonagle Collection	1	Hand specimen
2478265	AZ	8140	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1082	LM Number	McMonagle Collection	1	Hand specimen
2478266	AZ	8141	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1083	LM Number	McMonagle Collection	1	Hand specimen
2478267	AZ	8142	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1084	LM Number	McMonagle Collection	1	Hand specimen
2478268	AZ	8143	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1085	LM Number	McMonagle Collection	1	Hand specimen

2478269	AZ	8144	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1086	LM Number	McMonagle Collection	1	Hand specimen
2478270	AZ	8145	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1087	LM Number	McMonagle Collection	1	Hand specimen
2478271	AZ	8146	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1088	LM Number	McMonagle Collection	1	Hand specimen
2478272	AZ	8147	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1089	LM Number	McMonagle Collection	1	Hand specimen
2478273	AZ	8148	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1090	LM Number	McMonagle Collection	1	Hand specimen
2478274	AZ	8149	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1091	LM Number	McMonagle Collection	1	Hand specimen
2478275	AZ	8150	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1092	LM Number	McMonagle Collection	1	Hand specimen
2478276	AZ	8151	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1093	LM Number	McMonagle Collection	1	Hand specimen
2478277	AZ	8152	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1094	LM Number	McMonagle Collection	1	Hand specimen
2478278	AZ	8153	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1095	LM Number	McMonagle Collection	1	Hand specimen
2478279	AZ	8154	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1096	LM Number	McMonagle Collection	1	Hand specimen
2478280	AZ	8155	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1097	LM Number	McMonagle Collection	1	Hand specimen
2478281	AZ	8156	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1098	LM Number	McMonagle Collection	1	Hand specimen
2478282	AZ	8157	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1099	LM Number	McMonagle Collection	1	Hand specimen
2478283	AZ	8158	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1100	LM Number	McMonagle Collection	1	Hand specimen
2478284	AZ	8159	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1101	LM Number	McMonagle Collection	1	Hand specimen
2478285	AZ	8160	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1102 (b) (i)	LM Number	McMonagle Collection	1	Hand specimen
2478286	AZ	8161	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1102 a	LM Number	McMonagle Collection	1	Hand specimen
2478287	AZ	8162	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.5.1102 b	LM Number	McMonagle Collection	1	Hand specimen
2478288	AZ	8163	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1105	LM Number	McMonagle Collection	1	Hand specimen
2478289	AZ	8164	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1106	LM Number	McMonagle Collection	1	Hand specimen
2478290	AZ	8165	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1107	LM Number	McMonagle Collection	1	Hand specimen
2478291	AZ	8166	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1108	LM Number	McMonagle Collection	1	Hand specimen
2478292	AZ	8167	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1109	LM Number	McMonagle Collection	1	Hand specimen
2478293	AZ	8168	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1110	LM Number	McMonagle Collection	1	Hand specimen
2478294	AZ	8169	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1113	LM Number	McMonagle Collection	1	Hand specimen
2478295	AZ	8170	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1114	LM Number	McMonagle Collection	1	Hand specimen
2478296	AZ	8171	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1115	LM Number	McMonagle Collection	1	Hand specimen
2478297	AZ	8172	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1116	LM Number	McMonagle Collection	1	Hand specimen
2478298	AZ	8173	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1118	LM Number	McMonagle Collection	1	Hand specimen
2478299	AZ	8174	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1119	LM Number	McMonagle Collection	1	Hand specimen
2478300	AZ	8175	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1121	LM Number	McMonagle Collection	1	Hand specimen
2478301	AZ	8176	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1122	LM Number	McMonagle Collection	1	Hand specimen
2478302	AZ	8177	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1123	LM Number	McMonagle Collection	1	Hand specimen
2478303	AZ	8178	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1125	LM Number	McMonagle Collection	1	Hand specimen
2478304	AZ	8179	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1127	LM Number	McMonagle Collection	1	Hand specimen
2478305	AZ	8180	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1128	LM Number	McMonagle Collection	1	Hand specimen
2478306	AZ	8181	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1129	LM Number	McMonagle Collection	1	Hand specimen
2478307	AZ	8182	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1130	LM Number	McMonagle Collection	1	Hand specimen
2478308	AZ	8183	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1131	LM Number	McMonagle Collection	1	Hand specimen
2478309	AZ	8184	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1132	LM Number	McMonagle Collection	1	Hand specimen
2478310	AZ	8185	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1133	LM Number	McMonagle Collection	1	Hand specimen
2478311	AZ	8186	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1134	LM Number	McMonagle Collection	1	Hand specimen
2478312	AZ	8187	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1135	LM Number	McMonagle Collection	1	Hand specimen
2478313	AZ	8188	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1136	LM Number	McMonagle Collection	1	Hand specimen
2478314	AZ	8189	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1137	LM Number	McMonagle Collection	1	Hand specimen
2478315	AZ	8190	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1138	LM Number	McMonagle Collection	1	Hand specimen
2478316	AZ	8191	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1139	LM Number	McMonagle Collection	1	Hand specimen
2478317	AZ	8192	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1140	LM Number	McMonagle Collection	1	Hand specimen
2478318	AZ	8193	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1142	LM Number	McMonagle Collection	1	Hand specimen
2478319	AZ	8194	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1145	LM Number	McMonagle Collection	1	Hand specimen
2478320	AZ	8195	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1146	LM Number	McMonagle Collection	1	Hand specimen
2478321	AZ	8196	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1147	LM Number	McMonagle Collection	1	Hand specimen
2478322	AZ	8197	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1148	LM Number	McMonagle Collection	1	Hand specimen
2478323	AZ	8198	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1149	LM Number	McMonagle Collection	1	Hand specimen
2478324	AZ	8199	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1150	LM Number	McMonagle Collection	1	Hand specimen
2478325	AZ	8200	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1151	LM Number	McMonagle Collection	1	Hand specimen
2478326	AZ	8201	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1153	LM Number	McMonagle Collection	1	Hand specimen
2478327	AZ	8202	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1155	LM Number	McMonagle Collection	1	Hand specimen
2478328	AZ	8203	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1156	LM Number	McMonagle Collection	1	Hand specimen
2478329	AZ	8204	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1157	LM Number	McMonagle Collection	1	Hand specimen
2478330	AZ	8205	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1159	LM Number	McMonagle Collection	1	Hand specimen
2478331	AZ	8206	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1160	LM Number	McMonagle Collection	1	Hand specimen
2478332	AZ	8207	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1161	LM Number	McMonagle Collection	1	Hand specimen
2478333	AZ	8208	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1162	LM Number	McMonagle Collection	1	Hand specimen
2478334	AZ	8209	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1163	LM Number	McMonagle Collection	1	Hand specimen
2478335	AZ	8210	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1164	LM Number	McMonagle Collection	1	Hand specimen
2478336	AZ	8211	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1166	LM Number	McMonagle Collection	1	Hand specimen
2478337	AZ	8212	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1167	LM Number	McMonagle Collection	1	Hand specimen
2478338	AZ	8213	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1168	LM Number	McMonagle Collection	1	Hand specimen
2478339	AZ	8214	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1169	LM Number	McMonagle Collection	1	Hand specimen
2478340	AZ	8215	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1170	LM Number	McMonagle Collection	1	Hand specimen
2478341	AZ	8216	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1172	LM Number	McMonagle Collection	1	Hand specimen
2478342	AZ	8217	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1173	LM Number	McMonagle Collection	1	Hand specimen
2478343	AZ	8218	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1174	LM Number	McMonagle Collection	1	Hand specimen
2478344	AZ	8219	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1176	LM Number	McMonagle Collection	1	Hand specimen
2478345	AZ	8220	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1177	LM Number	McMonagle Collection	1	Hand specimen

2478346	AZ	8221	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1178	LM Number	McMonagle Collection	1	Hand specimen
2478347	AZ	8222	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1179	LM Number	McMonagle Collection	1	Hand specimen
2478348	AZ	8223	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1180	LM Number	McMonagle Collection	1	Hand specimen
2478349	AZ	8224	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1181	LM Number	McMonagle Collection	1	Hand specimen
2478350	AZ	8225	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1182	LM Number	McMonagle Collection	1	Hand specimen
2478351	AZ	8226	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1184	LM Number	McMonagle Collection	1	Hand specimen
2478352	AZ	8227	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1185	LM Number	McMonagle Collection	1	Hand specimen
2478353	AZ	8228	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1186	LM Number	McMonagle Collection	1	Hand specimen
2478354	AZ	8229	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1187	LM Number	McMonagle Collection	1	Hand specimen
2478355	AZ	8230	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1188	LM Number	McMonagle Collection	1	Hand specimen
2478356	AZ	8231	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1189	LM Number	McMonagle Collection	1	Hand specimen
2478357	AZ	8232	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1190	LM Number	McMonagle Collection	1	Hand specimen
2478358	AZ	8233	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1191	LM Number	McMonagle Collection	1	Hand specimen
2478359	AZ	8234	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1192 (b) (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478360	AZ	8235	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.1192 b	LM Number	McMonagle Collection	1	Hand specimen
2478361	AZ	8236	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.6.577	LM Number	McMonagle Collection	1	Hand specimen
2478362	AZ	8237	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1195	LM Number	McMonagle Collection	1	Hand specimen
2478363	AZ	8238	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1196	LM Number	McMonagle Collection	1	Hand specimen
2478364	AZ	8239	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1199	LM Number	McMonagle Collection	1	Hand specimen
2478365	AZ	8240	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1200	LM Number	McMonagle Collection	1	Hand specimen
2478366	AZ	8241	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1201	LM Number	McMonagle Collection	1	Hand specimen
2478367	AZ	8242	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1203	LM Number	McMonagle Collection	1	Hand specimen
2478368	AZ	8243	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1206	LM Number	McMonagle Collection	1	Hand specimen
2478369	AZ	8244	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1208	LM Number	McMonagle Collection	1	Hand specimen
2478370	AZ	8245	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1210	LM Number	McMonagle Collection	1	Hand specimen
2478371	AZ	8246	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1211	LM Number	McMonagle Collection	1	Hand specimen
2478372	AZ	8247	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1213	LM Number	McMonagle Collection	1	Hand specimen
2478373	AZ	8248	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1214	LM Number	McMonagle Collection	1	Hand specimen
2478374	AZ	8249	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1215	LM Number	McMonagle Collection	1	Hand specimen
2478375	AZ	8250	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1219	LM Number	McMonagle Collection	1	Hand specimen
2478376	AZ	8251	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1220	LM Number	McMonagle Collection	1	Hand specimen
2478377	AZ	8252	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1221	LM Number	McMonagle Collection	1	Hand specimen
2478378	AZ	8253	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1222	LM Number	McMonagle Collection	1	Hand specimen
2478379	AZ	8254	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1223	LM Number	McMonagle Collection	1	Hand specimen
2478380	AZ	8255	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1224	LM Number	McMonagle Collection	1	Hand specimen
2478381	AZ	8256	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1225	LM Number	McMonagle Collection	1	Hand specimen
2478382	AZ	8257	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1226	LM Number	McMonagle Collection	1	Hand specimen
2478383	AZ	8258	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1227	LM Number	McMonagle Collection	1	Hand specimen
2478384	AZ	8259	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1228	LM Number	McMonagle Collection	1	Hand specimen
2478385	AZ	8260	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.7.1229	LM Number	McMonagle Collection	1	Hand specimen
2478386	AZ	8261	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1232	LM Number	McMonagle Collection	1	Hand specimen
2478387	AZ	8262	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1233	LM Number	McMonagle Collection	1	Hand specimen
2478388	AZ	8263	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1235	LM Number	McMonagle Collection	1	Hand specimen
2478389	AZ	8264	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1236	LM Number	McMonagle Collection	1	Hand specimen
2478390	AZ	8265	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1238	LM Number	McMonagle Collection	1	Hand specimen
2478391	AZ	8266	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1239	LM Number	McMonagle Collection	1	Hand specimen
2478392	AZ	8267	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1243	LM Number	McMonagle Collection	1	Hand specimen
2478393	AZ	8268	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1244	LM Number	McMonagle Collection	1	Hand specimen
2478394	AZ	8269	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1245	LM Number	McMonagle Collection	1	Hand specimen
2478395	AZ	8270	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1246	LM Number	McMonagle Collection	1	Hand specimen
2478396	AZ	8271	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1248	LM Number	McMonagle Collection	1	Hand specimen
2478397	AZ	8272	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1249	LM Number	McMonagle Collection	1	Hand specimen
2478398	AZ	8273	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1250	LM Number	McMonagle Collection	1	Hand specimen
2478399	AZ	8274	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1252	LM Number	McMonagle Collection	1	Hand specimen
2478400	AZ	8275	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1253	LM Number	McMonagle Collection	1	Hand specimen
2478401	AZ	8276	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1256	LM Number	McMonagle Collection	1	Hand specimen
2478402	AZ	8277	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1258	LM Number	McMonagle Collection	1	Hand specimen
2478403	AZ	8278	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1259	LM Number	McMonagle Collection	1	Hand specimen
2478404	AZ	8279	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1260	LM Number	McMonagle Collection	1	Hand specimen
2478405	AZ	8280	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1261	LM Number	McMonagle Collection	1	Hand specimen
2478406	AZ	8281	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1262	LM Number	McMonagle Collection	1	Hand specimen
2478407	AZ	8282	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1263	LM Number	McMonagle Collection	1	Hand specimen
2478408	AZ	8283	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1265	LM Number	McMonagle Collection	1	Hand specimen
2478409	AZ	8284	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1266	LM Number	McMonagle Collection	1	Hand specimen
2478410	AZ	8285	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1268	LM Number	McMonagle Collection	1	Hand specimen
2478411	AZ	8286	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1271	LM Number	McMonagle Collection	1	Hand specimen
2478412	AZ	8287	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1272	LM Number	McMonagle Collection	1	Hand specimen
2478413	AZ	8288	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1273	LM Number	McMonagle Collection	1	Hand specimen
2478414	AZ	8289	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1274	LM Number	McMonagle Collection	1	Hand specimen
2478415	AZ	8290	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1276	LM Number	McMonagle Collection	1	Hand specimen
2478416	AZ	8291	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1277	LM Number	McMonagle Collection	1	Hand specimen
2478417	AZ	8292	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1278	LM Number	McMonagle Collection	1	Hand specimen
2478418	AZ	8293	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1279	LM Number	McMonagle Collection	1	Hand specimen
2478419	AZ	8294	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1280	LM Number	McMonagle Collection	1	Hand specimen
2478420	AZ	8295	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1282	LM Number	McMonagle Collection	1	Hand specimen
2478421	AZ	8296	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1283	LM Number	McMonagle Collection	1	Hand specimen
2478422	AZ	8297	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1284	LM Number	McMonagle Collection	1	Hand specimen

2478423	AZ	8298	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1286	LM Number	McMonagle Collection	1	Hand specimen
2478424	AZ	8299	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1288	LM Number	McMonagle Collection	1	Hand specimen
2478425	AZ	8300	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_4.8.1289	LM Number	McMonagle Collection	1	Hand specimen
2478426	AZ	8301	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1291	LM Number	McMonagle Collection	1	Hand specimen
2478427	AZ	8302	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1292	LM Number	McMonagle Collection	1	Hand specimen
2478428	AZ	8303	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1293	LM Number	McMonagle Collection	1	Hand specimen
2478429	AZ	8304	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1294	LM Number	McMonagle Collection	1	Hand specimen
2478430	AZ	8305	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1295	LM Number	McMonagle Collection	1	Hand specimen
2478431	AZ	8306	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1296	LM Number	McMonagle Collection	1	Hand specimen
2478432	AZ	8307	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1297	LM Number	McMonagle Collection	1	Hand specimen
2478433	AZ	8308	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1298	LM Number	McMonagle Collection	1	Hand specimen
2478434	AZ	8309	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1299	LM Number	McMonagle Collection	1	Hand specimen
2478435	AZ	8310	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1300.	LM Number	McMonagle Collection	1	Hand specimen
2478436	AZ	8311	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1301	LM Number	McMonagle Collection	1	Hand specimen
2478437	AZ	8312	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1302	LM Number	McMonagle Collection	1	Hand specimen
2478438	AZ	8313	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1303	LM Number	McMonagle Collection	1	Hand specimen
2478439	AZ	8314	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1304	LM Number	McMonagle Collection	1	Hand specimen
2478440	AZ	8315	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1305	LM Number	McMonagle Collection	1	Hand specimen
2478441	AZ	8316	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1306	LM Number	McMonagle Collection	1	Hand specimen
2478442	AZ	8317	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1307	LM Number	McMonagle Collection	1	Hand specimen
2478443	AZ	8318	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1308	LM Number	McMonagle Collection	1	Hand specimen
2478444	AZ	8319	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1309	LM Number	McMonagle Collection	1	Hand specimen
2478445	AZ	8320	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1310	LM Number	McMonagle Collection	1	Hand specimen
2478446	AZ	8321	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1311	LM Number	McMonagle Collection	1	Hand specimen
2478447	AZ	8322	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1312	LM Number	McMonagle Collection	1	Hand specimen
2478448	AZ	8323	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1313	LM Number	McMonagle Collection	1	Hand specimen
2478449	AZ	8324	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1314	LM Number	McMonagle Collection	1	Hand specimen
2478450	AZ	8325	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1315	LM Number	McMonagle Collection	1	Hand specimen
2478451	AZ	8326	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1316	LM Number	McMonagle Collection	1	Hand specimen
2478452	AZ	8327	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1317	LM Number	McMonagle Collection	1	Hand specimen
2478453	AZ	8328	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1318	LM Number	McMonagle Collection	1	Hand specimen
2478454	AZ	8329	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1319	LM Number	McMonagle Collection	1	Hand specimen
2478455	AZ	8330	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1320	LM Number	McMonagle Collection	1	Hand specimen
2478456	AZ	8331	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1321	LM Number	McMonagle Collection	1	Hand specimen
2478457	AZ	8332	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1322	LM Number	McMonagle Collection	1	Hand specimen
2478458	AZ	8333	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1323	LM Number	McMonagle Collection	1	Hand specimen
2478459	AZ	8334	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1324	LM Number	McMonagle Collection	1	Hand specimen
2478460	AZ	8335	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1326	LM Number	McMonagle Collection	1	Hand specimen
2478461	AZ	8336	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1327	LM Number	McMonagle Collection	1	Hand specimen
2478462	AZ	8337	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1328	LM Number	McMonagle Collection	1	Hand specimen
2478463	AZ	8338	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1329	LM Number	McMonagle Collection	1	Hand specimen
2478464	AZ	8339	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1330	LM Number	McMonagle Collection	1	Hand specimen
2478465	AZ	8340	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1331	LM Number	McMonagle Collection	1	Hand specimen
2478466	AZ	8341	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1332	LM Number	McMonagle Collection	1	Hand specimen
2478467	AZ	8342	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1333	LM Number	McMonagle Collection	1	Hand specimen
2478468	AZ	8343	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1334	LM Number	McMonagle Collection	1	Hand specimen
2478469	AZ	8344	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1335	LM Number	McMonagle Collection	1	Hand specimen
2478470	AZ	8345	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1336	LM Number	McMonagle Collection	1	Hand specimen
2478471	AZ	8346	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1337	LM Number	McMonagle Collection	1	Hand specimen
2478472	AZ	8347	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1338	LM Number	McMonagle Collection	1	Hand specimen
2478473	AZ	8348	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1339	LM Number	McMonagle Collection	1	Hand specimen
2478474	AZ	8349	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1340	LM Number	McMonagle Collection	1	Hand specimen
2478475	AZ	8350	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1341	LM Number	McMonagle Collection	1	Hand specimen
2478476	AZ	8351	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1342	LM Number	McMonagle Collection	1	Hand specimen
2478477	AZ	8352	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1343	LM Number	McMonagle Collection	1	Hand specimen
2478478	AZ	8353	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1344	LM Number	McMonagle Collection	1	Hand specimen
2478479	AZ	8354	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1345	LM Number	McMonagle Collection	1	Hand specimen
2478480	AZ	8355	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1346	LM Number	McMonagle Collection	1	Hand specimen
2478481	AZ	8356	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1347	LM Number	McMonagle Collection	1	Hand specimen
2478482	AZ	8357	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1348	LM Number	McMonagle Collection	1	Hand specimen
2478483	AZ	8358	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1349	LM Number	McMonagle Collection	1	Hand specimen
2478484	AZ	8359	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1350	LM Number	McMonagle Collection	1	Hand specimen
2478485	AZ	8360	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1351	LM Number	McMonagle Collection	1	Hand specimen
2478486	AZ	8361	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1352	LM Number	McMonagle Collection	1	Hand specimen
2478487	AZ	8362	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1353	LM Number	McMonagle Collection	1	Hand specimen
2478488	AZ	8363	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1354	LM Number	McMonagle Collection	1	Hand specimen
2478489	AZ	8364	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1355	LM Number	McMonagle Collection	1	Hand specimen
2478490	AZ	8365	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1356	LM Number	McMonagle Collection	1	Hand specimen
2478491	AZ	8366	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1357	LM Number	McMonagle Collection	1	Hand specimen
2478492	AZ	8367	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1358	LM Number	McMonagle Collection	1	Hand specimen
2478493	AZ	8368	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1359	LM Number	McMonagle Collection	1	Hand specimen
2478494	AZ	8369	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1360.	LM Number	McMonagle Collection	1	Hand specimen

2478495	AZ	8370	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1361	LM Number	McMonagle Collection	1	Hand specimen
2478496	AZ	8371	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1362	LM Number	McMonagle Collection	1	Hand specimen
2478497	AZ	8372	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1363	LM Number	McMonagle Collection	1	Hand specimen
2478498	AZ	8373	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1364	LM Number	McMonagle Collection	1	Hand specimen
2478499	AZ	8374	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1365	LM Number	McMonagle Collection	1	Hand specimen
2478500	AZ	8375	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1366	LM Number	McMonagle Collection	1	Hand specimen
2478501	AZ	8376	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1367	LM Number	McMonagle Collection	1	Hand specimen
2478502	AZ	8377	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1368	LM Number	McMonagle Collection	1	Hand specimen
2478503	AZ	8378	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1369	LM Number	McMonagle Collection	1	Hand specimen
2478504	AZ	8379	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1370	LM Number	McMonagle Collection	1	Hand specimen
2478505	AZ	8380	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1371	LM Number	McMonagle Collection	1	Hand specimen
2478506	AZ	8381	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1372	LM Number	McMonagle Collection	1	Hand specimen
2478507	AZ	8382	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1373	LM Number	McMonagle Collection	1	Hand specimen
2478508	AZ	8383	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1374	LM Number	McMonagle Collection	1	Hand specimen
2478509	AZ	8384	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1375	LM Number	McMonagle Collection	1	Hand specimen
2478510	AZ	8385	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1376	LM Number	McMonagle Collection	1	Hand specimen
2478511	AZ	8386	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1377	LM Number	McMonagle Collection	1	Hand specimen
2478512	AZ	8387	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1378	LM Number	McMonagle Collection	1	Hand specimen
2478513	AZ	8388	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1379	LM Number	McMonagle Collection	1	Hand specimen
2478514	AZ	8389	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1381	LM Number	McMonagle Collection	1	Hand specimen
2478515	AZ	8390	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1382	LM Number	McMonagle Collection	1	Hand specimen
2478516	AZ	8391	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1383	LM Number	McMonagle Collection	1	Hand specimen
2478517	AZ	8392	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1384	LM Number	McMonagle Collection	1	Hand specimen
2478518	AZ	8393	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1385	LM Number	McMonagle Collection	1	Hand specimen
2478519	AZ	8394	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1386	LM Number	McMonagle Collection	1	Hand specimen
2478520	AZ	8395	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1387	LM Number	McMonagle Collection	1	Hand specimen
2478521	AZ	8396	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1388	LM Number	McMonagle Collection	1	Hand specimen
2478522	AZ	8397	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1389	LM Number	McMonagle Collection	1	Hand specimen
2478523	AZ	8398	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1390.	LM Number	McMonagle Collection	1	Hand specimen
2478524	AZ	8399	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1391	LM Number	McMonagle Collection	1	Hand specimen
2478525	AZ	8400	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1392	LM Number	McMonagle Collection	1	Hand specimen
2478526	AZ	8401	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1393	LM Number	McMonagle Collection	1	Hand specimen
2478527	AZ	8402	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1394	LM Number	McMonagle Collection	1	Hand specimen
2478528	AZ	8403	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1395	LM Number	McMonagle Collection	1	Hand specimen
2478529	AZ	8404	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1396	LM Number	McMonagle Collection	1	Hand specimen
2478530	AZ	8405	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1397	LM Number	McMonagle Collection	1	Hand specimen
2478531	AZ	8406	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1398	LM Number	McMonagle Collection	1	Hand specimen
2478532	AZ	8407	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1399	LM Number	McMonagle Collection	1	Hand specimen
2478533	AZ	8408	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1400	LM Number	McMonagle Collection	1	Hand specimen
2478534	AZ	8409	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1401	LM Number	McMonagle Collection	1	Hand specimen
2478535	AZ	8410	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1402	LM Number	McMonagle Collection	1	Hand specimen
2478536	AZ	8411	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1403	LM Number	McMonagle Collection	1	Hand specimen
2478537	AZ	8412	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1404	LM Number	McMonagle Collection	1	Hand specimen
2478538	AZ	8413	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1405	LM Number	McMonagle Collection	1	Hand specimen
2478539	AZ	8414	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1406	LM Number	McMonagle Collection	1	Hand specimen
2478540	AZ	8415	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1407	LM Number	McMonagle Collection	1	Hand specimen
2478541	AZ	8416	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1408	LM Number	McMonagle Collection	1	Hand specimen
2478542	AZ	8417	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1409	LM Number	McMonagle Collection	1	Hand specimen
2478543	AZ	8418	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1410	LM Number	McMonagle Collection	1	Hand specimen
2478544	AZ	8419	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1411	LM Number	McMonagle Collection	1	Hand specimen
2478545	AZ	8420	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1412	LM Number	McMonagle Collection	1	Hand specimen
2478546	AZ	8421	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1414	LM Number	McMonagle Collection	1	Hand specimen
2478547	AZ	8422	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1415	LM Number	McMonagle Collection	1	Hand specimen
2478548	AZ	8423	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1417	LM Number	McMonagle Collection	1	Hand specimen
2478549	AZ	8424	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1418	LM Number	McMonagle Collection	1	Hand specimen
2478550	AZ	8425	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1419	LM Number	McMonagle Collection	1	Hand specimen
2478551	AZ	8426	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1420	LM Number	McMonagle Collection	1	Hand specimen
2478552	AZ	8427	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1421	LM Number	McMonagle Collection	1	Hand specimen
2478553	AZ	8428	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1422	LM Number	McMonagle Collection	1	Hand specimen
2478554	AZ	8429	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1423	LM Number	McMonagle Collection	1	Hand specimen
2478555	AZ	8430	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1424	LM Number	McMonagle Collection	1	Hand specimen
2478556	AZ	8431	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1425	LM Number	McMonagle Collection	1	Hand specimen
2478557	AZ	8432	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1426	LM Number	McMonagle Collection	1	Hand specimen
2478558	AZ	8433	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1428	LM Number	McMonagle Collection	1	Hand specimen
2478559	AZ	8434	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1430.	LM Number	McMonagle Collection	1	Hand specimen
2478560	AZ	8435	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1431 (a)	LM Number	McMonagle Collection	1	Hand specimen
2478561	AZ	8436	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1431 (b)	LM Number	McMonagle Collection	1	Hand specimen
2478562	AZ	8437	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1432	LM Number	McMonagle Collection	1	Hand specimen
2478563	AZ	8438	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1433	LM Number	McMonagle Collection	1	Hand specimen
2478564	AZ	8439	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1434	LM Number	McMonagle Collection	1	Hand specimen
2478565	AZ	8440	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1437	LM Number	McMonagle Collection	1	Hand specimen
2478566	AZ	8441	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1438	LM Number	McMonagle Collection	1	Hand specimen

2478567	AZ	8442	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1439	LM Number	McMonagle Collection	1	Hand specimen
2478568	AZ	8443	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1440	LM Number	McMonagle Collection	1	Hand specimen
2478569	AZ	8444	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1443	LM Number	McMonagle Collection	1	Hand specimen
2478570	AZ	8445	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1444	LM Number	McMonagle Collection	1	Hand specimen
2478571	AZ	8446	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1445	LM Number	McMonagle Collection	1	Hand specimen
2478572	AZ	8447	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1446	LM Number	McMonagle Collection	1	Hand specimen
2478573	AZ	8448	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1447	LM Number	McMonagle Collection	1	Hand specimen
2478574	AZ	8449	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1448	LM Number	McMonagle Collection	1	Hand specimen
2478575	AZ	8450	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1449	LM Number	McMonagle Collection	1	Hand specimen
2478576	AZ	8451	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1450	LM Number	McMonagle Collection	1	Hand specimen
2478577	AZ	8452	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1452	LM Number	McMonagle Collection	1	Hand specimen
2478578	AZ	8453	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1453	LM Number	McMonagle Collection	1	Hand specimen
2478579	AZ	8454	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1454	LM Number	McMonagle Collection	1	Hand specimen
2478580	AZ	8455	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1455	LM Number	McMonagle Collection	1	Hand specimen
2478581	AZ	8456	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1456	LM Number	McMonagle Collection	1	Hand specimen
2478582	AZ	8457	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1457	LM Number	McMonagle Collection	1	Hand specimen
2478583	AZ	8458	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1458	LM Number	McMonagle Collection	1	Hand specimen
2478584	AZ	8459	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_5.-.1460.	LM Number	McMonagle Collection	1	Hand specimen
2478585	AZ	8460	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ/LSaQ: 2026	LM Number	McMonagle Collection	1	Hand specimen
2478586	AZ	8461	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ/LSaQ: 2039	LM Number	McMonagle Collection	1	Hand specimen
2478587	AZ	8462	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2007	LM Number	McMonagle Collection	1	Hand specimen
2478588	AZ	8463	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2009	LM Number	McMonagle Collection	1	Hand specimen
2478589	AZ	8464	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2013	LM Number	McMonagle Collection	1	Hand specimen
2478590	AZ	8465	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2014	LM Number	McMonagle Collection	1	Hand specimen
2478591	AZ	8466	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2015	LM Number	McMonagle Collection	1	Hand specimen
2478592	AZ	8467	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2018	LM Number	McMonagle Collection	1	Hand specimen
2478593	AZ	8468	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2029 a	LM Number	McMonagle Collection	1	Hand specimen
2478594	AZ	8469	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ: 2029 b	LM Number	McMonagle Collection	1	Hand specimen
2478595	AZ	8470	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LQ2: 2035	LM Number	McMonagle Collection	1	Hand specimen
2478596	AZ	8471	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa 198	LM Number	McMonagle Collection	1	Hand specimen
2478597	AZ	8472	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa 241	LM Number	McMonagle Collection	1	Hand specimen
2478598	AZ	8473	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa 245	LM Number	McMonagle Collection	1	Hand specimen
2478599	AZ	8474	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa 402 (a)	LM Number	McMonagle Collection	1	Hand specimen
2478600	AZ	8475	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2000	LM Number	McMonagle Collection	1	Hand specimen
2478601	AZ	8476	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2001	LM Number	McMonagle Collection	1	Hand specimen
2478602	AZ	8477	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2002	LM Number	McMonagle Collection	1	Hand specimen
2478603	AZ	8478	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2003	LM Number	McMonagle Collection	1	Hand specimen
2478604	AZ	8479	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2005	LM Number	McMonagle Collection	1	Hand specimen
2478605	AZ	8480	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2006	LM Number	McMonagle Collection	1	Hand specimen
2478606	AZ	8481	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2008	LM Number	McMonagle Collection	1	Hand specimen
2478607	AZ	8482	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2010	LM Number	McMonagle Collection	1	Hand specimen
2478608	AZ	8483	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2011	LM Number	McMonagle Collection	1	Hand specimen
2478609	AZ	8484	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2017	LM Number	McMonagle Collection	1	Hand specimen
2478610	AZ	8485	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2019	LM Number	McMonagle Collection	1	Hand specimen
2478611	AZ	8486	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2020	LM Number	McMonagle Collection	1	Hand specimen
2478612	AZ	8487	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2021	LM Number	McMonagle Collection	1	Hand specimen
2478613	AZ	8488	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2022	LM Number	McMonagle Collection	1	Hand specimen
2478614	AZ	8489	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2024	LM Number	McMonagle Collection	1	Hand specimen
2478615	AZ	8490	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2028	LM Number	McMonagle Collection	1	Hand specimen
2478616	AZ	8491	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2031	LM Number	McMonagle Collection	1	Hand specimen
2478617	AZ	8492	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2032	LM Number	McMonagle Collection	1	Hand specimen
2478618	AZ	8493	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2034	LM Number	McMonagle Collection	1	Hand specimen
2478619	AZ	8494	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 2036	LM Number	McMonagle Collection	1	Hand specimen
2478620	AZ	8495	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa: 209	LM Number	McMonagle Collection	1	Hand specimen
2478621	AZ	8496	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 196	LM Number	McMonagle Collection	1	Hand specimen
2478622	AZ	8497	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 197	LM Number	McMonagle Collection	1	Hand specimen
2478623	AZ	8498	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 199	LM Number	McMonagle Collection	1	Hand specimen
2478624	AZ	8499	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 200	LM Number	McMonagle Collection	1	Hand specimen
2478625	AZ	8500	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 202	LM Number	McMonagle Collection	1	Hand specimen
2478626	AZ	8501	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 2027	LM Number	McMonagle Collection	1	Hand specimen
2478627	AZ	8502	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 2027 b	LM Number	McMonagle Collection	1	Hand specimen
2478628	AZ	8503	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 203	LM Number	McMonagle Collection	1	Hand specimen
2478629	AZ	8504	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 2037	LM Number	McMonagle Collection	1	Hand specimen
2478630	AZ	8505	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 204	LM Number	McMonagle Collection	1	Hand specimen
2478631	AZ	8506	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 205	LM Number	McMonagle Collection	1	Hand specimen
2478632	AZ	8507	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 206	LM Number	McMonagle Collection	1	Hand specimen
2478633	AZ	8508	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 207	LM Number	McMonagle Collection	1	Hand specimen
2478634	AZ	8509	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 208	LM Number	McMonagle Collection	1	Hand specimen
2478635	AZ	8510	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 212	LM Number	McMonagle Collection	1	Hand specimen
2478636	AZ	8511	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 213 b	LM Number	McMonagle Collection	1	Hand specimen
2478637	AZ	8512	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 402	LM Number	McMonagle Collection	1	Hand specimen
2478638	AZ	8513	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa1: 78	LM Number	McMonagle Collection	1	Hand specimen
2478639	AZ	8514	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 222	LM Number	McMonagle Collection	1	Hand specimen
2478640	AZ	8515	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 223	LM Number	McMonagle Collection	1	Hand specimen
2478641	AZ	8516	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 b	LM Number	McMonagle Collection	1	Hand specimen
2478642	AZ	8517	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 d	LM Number	McMonagle Collection	1	Hand specimen

2478643	AZ	8518	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 e	LM Number	McMonagle Collection	1	Hand specimen
2478644	AZ	8519	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 e (i)	LM Number	McMonagle Collection	1	Hand specimen
2478645	AZ	8520	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 f	LM Number	McMonagle Collection	1	Hand specimen
2478646	AZ	8521	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 g	LM Number	McMonagle Collection	1	Hand specimen
2478647	AZ	8522	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 h	LM Number	McMonagle Collection	1	Hand specimen
2478648	AZ	8523	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 j	LM Number	McMonagle Collection	1	Hand specimen
2478649	AZ	8524	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 k	LM Number	McMonagle Collection	1	Hand specimen
2478650	AZ	8525	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 225 l	LM Number	McMonagle Collection	1	Hand specimen
2478651	AZ	8526	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 226	LM Number	McMonagle Collection	1	Hand specimen
2478652	AZ	8527	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 227	LM Number	McMonagle Collection	1	Hand specimen
2478653	AZ	8528	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 228	LM Number	McMonagle Collection	1	Hand specimen
2478654	AZ	8529	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 229	LM Number	McMonagle Collection	1	Hand specimen
2478655	AZ	8530	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 230	LM Number	McMonagle Collection	1	Hand specimen
2478656	AZ	8531	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 231	LM Number	McMonagle Collection	1	Hand specimen
2478657	AZ	8532	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 234	LM Number	McMonagle Collection	1	Hand specimen
2478658	AZ	8533	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 235	LM Number	McMonagle Collection	1	Hand specimen
2478659	AZ	8534	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 239	LM Number	McMonagle Collection	1	Hand specimen
2478660	AZ	8535	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 240	LM Number	McMonagle Collection	1	Hand specimen
2478661	AZ	8536	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 242	LM Number	McMonagle Collection	1	Hand specimen
2478662	AZ	8537	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 243	LM Number	McMonagle Collection	1	Hand specimen
2478663	AZ	8538	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 244	LM Number	McMonagle Collection	1	Hand specimen
2478664	AZ	8539	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSa2: 246	LM Number	McMonagle Collection	1	Hand specimen
2478665	AZ	8540	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSaQ: 2041	LM Number	McMonagle Collection	1	Hand specimen
2478666	AZ	8541	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_LSaQ2: 220	LM Number	McMonagle Collection	1	Hand specimen
2478667	AZ	8542	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_MQ III: 2025	LM Number	McMonagle Collection	1	Hand specimen
2478668	AZ	8543	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_MQ2 1: 164	LM Number	McMonagle Collection	1	Hand specimen
2478669	AZ	8544	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_MQ2 168	LM Number	McMonagle Collection	1	Hand specimen
2478670	AZ	8545	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_NQ1: 186	LM Number	McMonagle Collection	1	Hand specimen
2478671	AZ	8546	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_NQ1: 187	LM Number	McMonagle Collection	1	Hand specimen
2478672	AZ	8547	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_NQ1: 190	LM Number	McMonagle Collection	1	Hand specimen
2478673	AZ	8548	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_NQ1: 191	LM Number	McMonagle Collection	1	Hand specimen
2478674	AZ	8549	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_NQ1: 194	LM Number	McMonagle Collection	1	Hand specimen
2478675	AZ	8550	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 299	LM Number	McMonagle Collection	1	Hand specimen
2478676	AZ	8551	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 305	LM Number	McMonagle Collection	1	Hand specimen
2478677	AZ	8552	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 321	LM Number	McMonagle Collection	1	Hand specimen
2478678	AZ	8553	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 422	LM Number	McMonagle Collection	1	Hand specimen
2478679	AZ	8554	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 432	LM Number	McMonagle Collection	1	Hand specimen
2478680	AZ	8555	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO 433	LM Number	McMonagle Collection	1	Hand specimen
2478681	AZ	8556	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 2004	LM Number	McMonagle Collection	1	Hand specimen
2478682	AZ	8557	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 2030	LM Number	McMonagle Collection	1	Hand specimen
2478683	AZ	8558	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 315	LM Number	McMonagle Collection	1	Hand specimen
2478684	AZ	8559	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 401 (e)	LM Number	McMonagle Collection	1	Hand specimen
2478685	AZ	8560	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 410	LM Number	McMonagle Collection	1	Hand specimen
2478686	AZ	8561	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 411	LM Number	McMonagle Collection	1	Hand specimen
2478687	AZ	8562	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 412	LM Number	McMonagle Collection	1	Hand specimen
2478688	AZ	8563	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 413	LM Number	McMonagle Collection	1	Hand specimen
2478689	AZ	8564	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 414	LM Number	McMonagle Collection	1	Hand specimen
2478690	AZ	8565	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 415	LM Number	McMonagle Collection	1	Hand specimen
2478691	AZ	8566	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 416	LM Number	McMonagle Collection	1	Hand specimen
2478692	AZ	8567	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 417	LM Number	McMonagle Collection	1	Hand specimen
2478693	AZ	8568	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 418	LM Number	McMonagle Collection	1	Hand specimen
2478694	AZ	8569	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 419	LM Number	McMonagle Collection	1	Hand specimen
2478695	AZ	8570	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 420	LM Number	McMonagle Collection	1	Hand specimen
2478696	AZ	8571	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 421	LM Number	McMonagle Collection	1	Hand specimen
2478697	AZ	8572	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 423	LM Number	McMonagle Collection	1	Hand specimen
2478698	AZ	8573	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 424	LM Number	McMonagle Collection	1	Hand specimen
2478699	AZ	8574	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 425	LM Number	McMonagle Collection	1	Hand specimen
2478700	AZ	8575	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 426	LM Number	McMonagle Collection	1	Hand specimen
2478701	AZ	8576	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 427	LM Number	McMonagle Collection	1	Hand specimen
2478702	AZ	8577	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 428	LM Number	McMonagle Collection	1	Hand specimen
2478703	AZ	8578	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 429	LM Number	McMonagle Collection	1	Hand specimen
2478704	AZ	8579	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 430	LM Number	McMonagle Collection	1	Hand specimen
2478705	AZ	8580	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 431	LM Number	McMonagle Collection	1	Hand specimen
2478706	AZ	8581	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 434	LM Number	McMonagle Collection	1	Hand specimen
2478707	AZ	8582	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 435	LM Number	McMonagle Collection	1	Hand specimen
2478708	AZ	8583	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 436	LM Number	McMonagle Collection	1	Hand specimen
2478709	AZ	8584	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 437	LM Number	McMonagle Collection	1	Hand specimen
2478710	AZ	8585	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PO: 439	LM Number	McMonagle Collection	1	Hand specimen
2478711	AZ	8586	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 214	LM Number	McMonagle Collection	1	Hand specimen
2478712	AZ	8587	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 215	LM Number	McMonagle Collection	1	Hand specimen
2478713	AZ	8588	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 217	LM Number	McMonagle Collection	1	Hand specimen
2478714	AZ	8589	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 218	LM Number	McMonagle Collection	1	Hand specimen
2478715	AZ	8590	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 219	LM Number	McMonagle Collection	1	Hand specimen
2478716	AZ	8591	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 287	LM Number	McMonagle Collection	1	Hand specimen
2478717	AZ	8592	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 295	LM Number	McMonagle Collection	1	Hand specimen
2478718	AZ	8593	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 297	LM Number	McMonagle Collection	1	Hand specimen
2478719	AZ	8594	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 300	LM Number	McMonagle Collection	1	Hand specimen

2478720	AZ	8595	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 301	LM Number	McMonagle Collection	1	Hand specimen
2478721	AZ	8596	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 302	LM Number	McMonagle Collection	1	Hand specimen
2478722	AZ	8597	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 304	LM Number	McMonagle Collection	1	Hand specimen
2478723	AZ	8598	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 306	LM Number	McMonagle Collection	1	Hand specimen
2478724	AZ	8599	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 309	LM Number	McMonagle Collection	1	Hand specimen
2478725	AZ	8600	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 310	LM Number	McMonagle Collection	1	Hand specimen
2478726	AZ	8601	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 311	LM Number	McMonagle Collection	1	Hand specimen
2478727	AZ	8602	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 312	LM Number	McMonagle Collection	1	Hand specimen
2478728	AZ	8603	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 313	LM Number	McMonagle Collection	1	Hand specimen
2478729	AZ	8604	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 314	LM Number	McMonagle Collection	1	Hand specimen
2478730	AZ	8605	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 316	LM Number	McMonagle Collection	1	Hand specimen
2478731	AZ	8606	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 317	LM Number	McMonagle Collection	1	Hand specimen
2478732	AZ	8607	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 318	LM Number	McMonagle Collection	1	Hand specimen
2478733	AZ	8608	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 320	LM Number	McMonagle Collection	1	Hand specimen
2478734	AZ	8609	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 323	LM Number	McMonagle Collection	1	Hand specimen
2478735	AZ	8610	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 324	LM Number	McMonagle Collection	1	Hand specimen
2478736	AZ	8611	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 325	LM Number	McMonagle Collection	1	Hand specimen
2478737	AZ	8612	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 326	LM Number	McMonagle Collection	1	Hand specimen
2478738	AZ	8613	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 327	LM Number	McMonagle Collection	1	Hand specimen
2478739	AZ	8614	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 328	LM Number	McMonagle Collection	1	Hand specimen
2478740	AZ	8615	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 329	LM Number	McMonagle Collection	1	Hand specimen
2478741	AZ	8616	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 330	LM Number	McMonagle Collection	1	Hand specimen
2478742	AZ	8617	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 a (i)	LM Number	McMonagle Collection	1	Hand specimen
2478743	AZ	8618	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 a (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478744	AZ	8619	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 b	LM Number	McMonagle Collection	1	Hand specimen
2478745	AZ	8620	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 c (i)	LM Number	McMonagle Collection	1	Hand specimen
2478746	AZ	8621	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 c (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478747	AZ	8622	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 h	LM Number	McMonagle Collection	1	Hand specimen
2478748	AZ	8623	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1: 401 i	LM Number	McMonagle Collection	1	Hand specimen
2478749	AZ	8624	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP1:303	LM Number	McMonagle Collection	1	Hand specimen
2478750	AZ	8625	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_PP2: 401 g	LM Number	McMonagle Collection	1	Hand specimen
2478751	AZ	8626	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ 105	LM Number	McMonagle Collection	1	Hand specimen
2478752	AZ	8627	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ 160	LM Number	McMonagle Collection	1	Hand specimen
2478753	AZ	8628	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ 161	LM Number	McMonagle Collection	1	Hand specimen
2478754	AZ	8629	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ: 94	LM Number	McMonagle Collection	1	Hand specimen
2478755	AZ	8630	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 100	LM Number	McMonagle Collection	1	Hand specimen
2478756	AZ	8631	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 101	LM Number	McMonagle Collection	1	Hand specimen
2478757	AZ	8632	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 102	LM Number	McMonagle Collection	1	Hand specimen
2478758	AZ	8633	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 104	LM Number	McMonagle Collection	1	Hand specimen
2478759	AZ	8634	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 106	LM Number	McMonagle Collection	1	Hand specimen
2478760	AZ	8635	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 107	LM Number	McMonagle Collection	1	Hand specimen
2478761	AZ	8636	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 111	LM Number	McMonagle Collection	1	Hand specimen
2478762	AZ	8637	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 112	LM Number	McMonagle Collection	1	Hand specimen
2478763	AZ	8638	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 113	LM Number	McMonagle Collection	1	Hand specimen
2478764	AZ	8639	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 114	LM Number	McMonagle Collection	1	Hand specimen
2478765	AZ	8640	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 115	LM Number	McMonagle Collection	1	Hand specimen
2478766	AZ	8641	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 116	LM Number	McMonagle Collection	1	Hand specimen
2478767	AZ	8642	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 117	LM Number	McMonagle Collection	1	Hand specimen
2478768	AZ	8643	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 118	LM Number	McMonagle Collection	1	Hand specimen
2478769	AZ	8644	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 119	LM Number	McMonagle Collection	1	Hand specimen
2478770	AZ	8645	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 120	LM Number	McMonagle Collection	1	Hand specimen
2478771	AZ	8646	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 121	LM Number	McMonagle Collection	1	Hand specimen
2478772	AZ	8647	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 123	LM Number	McMonagle Collection	1	Hand specimen
2478773	AZ	8648	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 125	LM Number	McMonagle Collection	1	Hand specimen
2478774	AZ	8649	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 128	LM Number	McMonagle Collection	1	Hand specimen
2478775	AZ	8650	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 129	LM Number	McMonagle Collection	1	Hand specimen
2478776	AZ	8651	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 130	LM Number	McMonagle Collection	1	Hand specimen
2478777	AZ	8652	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 131	LM Number	McMonagle Collection	1	Hand specimen
2478778	AZ	8653	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 132	LM Number	McMonagle Collection	1	Hand specimen
2478779	AZ	8654	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 133	LM Number	McMonagle Collection	1	Hand specimen
2478780	AZ	8655	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 134	LM Number	McMonagle Collection	1	Hand specimen
2478781	AZ	8656	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 136	LM Number	McMonagle Collection	1	Hand specimen
2478782	AZ	8657	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 137	LM Number	McMonagle Collection	1	Hand specimen
2478783	AZ	8658	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 138	LM Number	McMonagle Collection	1	Hand specimen
2478784	AZ	8659	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 139	LM Number	McMonagle Collection	1	Hand specimen
2478785	AZ	8660	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 147	LM Number	McMonagle Collection	1	Hand specimen
2478786	AZ	8661	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 210	LM Number	McMonagle Collection	1	Hand specimen
2478787	AZ	8662	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 36	LM Number	McMonagle Collection	1	Hand specimen
2478788	AZ	8663	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 49	LM Number	McMonagle Collection	1	Hand specimen
2478789	AZ	8664	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 50	LM Number	McMonagle Collection	1	Hand specimen
2478790	AZ	8665	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 51	LM Number	McMonagle Collection	1	Hand specimen
2478791	AZ	8666	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 52	LM Number	McMonagle Collection	1	Hand specimen
2478792	AZ	8667	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 54	LM Number	McMonagle Collection	1	Hand specimen
2478793	AZ	8668	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 58	LM Number	McMonagle Collection	1	Hand specimen
2478794	AZ	8669	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 59	LM Number	McMonagle Collection	1	Hand specimen
2478795	AZ	8670	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 60	LM Number	McMonagle Collection	1	Hand specimen
2478796	AZ	8671	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 61	LM Number	McMonagle Collection	1	Hand specimen

2478797	AZ	8672	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 62	LM Number	McMonagle Collection	1	Hand specimen
2478798	AZ	8673	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 63	LM Number	McMonagle Collection	1	Hand specimen
2478799	AZ	8674	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 65	LM Number	McMonagle Collection	1	Hand specimen
2478800	AZ	8675	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 66	LM Number	McMonagle Collection	1	Hand specimen
2478801	AZ	8676	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 68	LM Number	McMonagle Collection	1	Hand specimen
2478802	AZ	8677	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 69	LM Number	McMonagle Collection	1	Hand specimen
2478803	AZ	8678	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 71	LM Number	McMonagle Collection	1	Hand specimen
2478804	AZ	8679	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 72	LM Number	McMonagle Collection	1	Hand specimen
2478805	AZ	8680	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 80	LM Number	McMonagle Collection	1	Hand specimen
2478806	AZ	8681	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81 a	LM Number	McMonagle Collection	1	Hand specimen
2478807	AZ	8682	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81 c	LM Number	McMonagle Collection	1	Hand specimen
2478808	AZ	8683	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81 f	LM Number	McMonagle Collection	1	Hand specimen
2478809	AZ	8684	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81 f (i)	LM Number	McMonagle Collection	1	Hand specimen
2478810	AZ	8685	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81 f (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478811	AZ	8686	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81b	LM Number	McMonagle Collection	1	Hand specimen
2478812	AZ	8687	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 81e	LM Number	McMonagle Collection	1	Hand specimen
2478813	AZ	8688	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 82	LM Number	McMonagle Collection	1	Hand specimen
2478814	AZ	8689	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 83	LM Number	McMonagle Collection	1	Hand specimen
2478815	AZ	8690	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 84	LM Number	McMonagle Collection	1	Hand specimen
2478816	AZ	8691	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 85	LM Number	McMonagle Collection	1	Hand specimen
2478817	AZ	8692	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 86	LM Number	McMonagle Collection	1	Hand specimen
2478818	AZ	8693	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 87	LM Number	McMonagle Collection	1	Hand specimen
2478819	AZ	8694	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 88	LM Number	McMonagle Collection	1	Hand specimen
2478820	AZ	8695	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 91	LM Number	McMonagle Collection	1	Hand specimen
2478821	AZ	8696	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 95	LM Number	McMonagle Collection	1	Hand specimen
2478822	AZ	8697	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 96	LM Number	McMonagle Collection	1	Hand specimen
2478823	AZ	8698	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 97	LM Number	McMonagle Collection	1	Hand specimen
2478824	AZ	8699	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 98	LM Number	McMonagle Collection	1	Hand specimen
2478825	AZ	8700	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ1: 99	LM Number	McMonagle Collection	1	Hand specimen
2478826	AZ	8701	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 140	LM Number	McMonagle Collection	1	Hand specimen
2478827	AZ	8702	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 142	LM Number	McMonagle Collection	1	Hand specimen
2478828	AZ	8703	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 143	LM Number	McMonagle Collection	1	Hand specimen
2478829	AZ	8704	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 144	LM Number	McMonagle Collection	1	Hand specimen
2478830	AZ	8705	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 150	LM Number	McMonagle Collection	1	Hand specimen
2478831	AZ	8706	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 156	LM Number	McMonagle Collection	1	Hand specimen
2478832	AZ	8707	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 158	LM Number	McMonagle Collection	1	Hand specimen
2478833	AZ	8708	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 159	LM Number	McMonagle Collection	1	Hand specimen
2478834	AZ	8709	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 162	LM Number	McMonagle Collection	1	Hand specimen
2478835	AZ	8710	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 163	LM Number	McMonagle Collection	1	Hand specimen
2478836	AZ	8711	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 2038	LM Number	McMonagle Collection	1	Hand specimen
2478837	AZ	8712	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 76	LM Number	McMonagle Collection	1	Hand specimen
2478838	AZ	8713	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ2: 92	LM Number	McMonagle Collection	1	Hand specimen
2478839	AZ	8714	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SaQ3: 30/10/06 b (2040)	LM Number	McMonagle Collection	1	Hand specimen
2478840	AZ	8715	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ 1: 1	LM Number	McMonagle Collection	1	Hand specimen
2478841	AZ	8716	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ 17	LM Number	McMonagle Collection	1	Hand specimen
2478842	AZ	8717	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ 20	LM Number	McMonagle Collection	1	Hand specimen
2478843	AZ	8718	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 10	LM Number	McMonagle Collection	1	Hand specimen
2478844	AZ	8719	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 12	LM Number	McMonagle Collection	1	Hand specimen
2478845	AZ	8720	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 13	LM Number	McMonagle Collection	1	Hand specimen
2478846	AZ	8721	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 14	LM Number	McMonagle Collection	1	Hand specimen
2478847	AZ	8722	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 15	LM Number	McMonagle Collection	1	Hand specimen
2478848	AZ	8723	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 16	LM Number	McMonagle Collection	1	Hand specimen
2478849	AZ	8724	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 179	LM Number	McMonagle Collection	1	Hand specimen
2478850	AZ	8725	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 18	LM Number	McMonagle Collection	1	Hand specimen
2478851	AZ	8726	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 21	LM Number	McMonagle Collection	1	Hand specimen
2478852	AZ	8727	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 3	LM Number	McMonagle Collection	1	Hand specimen
2478853	AZ	8728	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 4	LM Number	McMonagle Collection	1	Hand specimen
2478854	AZ	8729	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 5	LM Number	McMonagle Collection	1	Hand specimen
2478855	AZ	8730	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 6	LM Number	McMonagle Collection	1	Hand specimen
2478856	AZ	8731	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 7	LM Number	McMonagle Collection	1	Hand specimen
2478857	AZ	8732	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 8	LM Number	McMonagle Collection	1	Hand specimen
2478858	AZ	8733	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ1: 9	LM Number	McMonagle Collection	1	Hand specimen
2478859	AZ	8734	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SRQ3: 23	LM Number	McMonagle Collection	1	Hand specimen
2478860	AZ	8735	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW 252	LM Number	McMonagle Collection	1	Hand specimen
2478861	AZ	8736	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW 292	LM Number	McMonagle Collection	1	Hand specimen
2478862	AZ	8737	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1 :253	LM Number	McMonagle Collection	1	Hand specimen
2478863	AZ	8738	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 2023	LM Number	McMonagle Collection	1	Hand specimen
2478864	AZ	8739	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 2033	LM Number	McMonagle Collection	1	Hand specimen
2478865	AZ	8740	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 238	LM Number	McMonagle Collection	1	Hand specimen
2478866	AZ	8741	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 247	LM Number	McMonagle Collection	1	Hand specimen
2478867	AZ	8742	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 248	LM Number	McMonagle Collection	1	Hand specimen
2478868	AZ	8743	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 249	LM Number	McMonagle Collection	1	Hand specimen
2478869	AZ	8744	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 250	LM Number	McMonagle Collection	1	Hand specimen
2478870	AZ	8745	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 251	LM Number	McMonagle Collection	1	Hand specimen
2478871	AZ	8746	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 254	LM Number	McMonagle Collection	1	Hand specimen
2478872	AZ	8747	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 255	LM Number	McMonagle Collection	1	Hand specimen
2478873	AZ	8748	Invertebrates	The Natural History Museum	Palaeontology	p84	No	Pl	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 256	LM Number	McMonagle Collection	1	Hand specimen

2478874	AZ	8749	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 257	LM Number	McMonagle Collection	1	Hand specimen
2478875	AZ	8750	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 260	LM Number	McMonagle Collection	1	Hand specimen
2478876	AZ	8751	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 261	LM Number	McMonagle Collection	1	Hand specimen
2478877	AZ	8752	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 262	LM Number	McMonagle Collection	1	Hand specimen
2478878	AZ	8753	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 263	LM Number	McMonagle Collection	1	Hand specimen
2478879	AZ	8754	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 264	LM Number	McMonagle Collection	1	Hand specimen
2478880	AZ	8755	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 265	LM Number	McMonagle Collection	1	Hand specimen
2478881	AZ	8756	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 266	LM Number	McMonagle Collection	1	Hand specimen
2478882	AZ	8757	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 268	LM Number	McMonagle Collection	1	Hand specimen
2478883	AZ	8758	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 269	LM Number	McMonagle Collection	1	Hand specimen
2478884	AZ	8759	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 272	LM Number	McMonagle Collection	1	Hand specimen
2478885	AZ	8760	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 273	LM Number	McMonagle Collection	1	Hand specimen
2478886	AZ	8761	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 274	LM Number	McMonagle Collection	1	Hand specimen
2478887	AZ	8762	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 275	LM Number	McMonagle Collection	1	Hand specimen
2478888	AZ	8763	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 278	LM Number	McMonagle Collection	1	Hand specimen
2478889	AZ	8764	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 279	LM Number	McMonagle Collection	1	Hand specimen
2478890	AZ	8765	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 280	LM Number	McMonagle Collection	1	Hand specimen
2478891	AZ	8766	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 281/400 f	LM Number	McMonagle Collection	1	Hand specimen
2478892	AZ	8767	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 281/400 f a (i)	LM Number	McMonagle Collection	1	Hand specimen
2478893	AZ	8768	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 281/400 g	LM Number	McMonagle Collection	1	Hand specimen
2478894	AZ	8769	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 282	LM Number	McMonagle Collection	1	Hand specimen
2478895	AZ	8770	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 284	LM Number	McMonagle Collection	1	Hand specimen
2478896	AZ	8771	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 285	LM Number	McMonagle Collection	1	Hand specimen
2478897	AZ	8772	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 289	LM Number	McMonagle Collection	1	Hand specimen
2478898	AZ	8773	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 290	LM Number	McMonagle Collection	1	Hand specimen
2478899	AZ	8774	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 400	LM Number	McMonagle Collection	1	Hand specimen
2478900	AZ	8775	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 400 c (i)	LM Number	McMonagle Collection	1	Hand specimen
2478901	AZ	8776	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1: 400 c (ii)	LM Number	McMonagle Collection	1	Hand specimen
2478902	AZ	8777	Invertebrates	The Natural History Museum	Palaeontology	p84	No	PI	Coelenterates - Anthozoa (AZ 1 >)	LM_SW1:281/ 400 h	LM Number	McMonagle Collection	1	Hand specimen

Group number	Specimen label	Year Collected	locality	Locality code	sample no.	Specimen no.	Subdivision	*genus*	*species*	no. of specimens	comments on preservation:	zoox/azoox	Genus extant/extinct	Species Extant/Extinct	Colony growth form
40	4.8.1240	2007	Lower Sanctuary Quarry	4	8	1240		*(Para) Clavarina*	*aff. triangularis*	1		z-like	Extant	Extinct	Foliaceous
40	LQ: 2016	2007	Lake Quarry	LQ	0	2016		*(Para) Clavarina*	*aff. triangularis*	1	Average	z-like	Extant	Extinct	Foliaceous
40	PP1: 401 c (ii)	2007	Police Outcrop	PP	0	401	c (ii)	*(Para) Clavarina*	*aff. triangularis*	1		z-like	Extant	Extinct	Foliaceous
98	LSa: 2019	2007	Lower Sanctuary Quarry	LSa	0	2019		*Acanthophyllia*	*sp.*	1	Poor	az-like	Extant	Extinct	Solitary
98	LSa: 2034	2007	Lower Sanctuary Quarry	LSa	0	2034		*Acanthophyllia*	*sp.*	1	Average	az-like	Extant	Extinct	Solitary
85	PO: 417	2007	Police Outcrop	PO	0	417		*Acanthophyllia*	*sp.*	1		az-like	Extant	Extinct	Solitary
84	PO: 425	2007	Police Outcrop	PO	0	425		*Acanthophyllia*	*sp.*	1		az-like	Extant	Extinct	Solitary
97	4.3.967	2007	Lower Sanctuary Quarry	4	3	967		*Acanthophyllia*	*sp. 2*	1		az-like	Extant	Extinct	Solitary
43	1.7.232	2007	Sanctuary Quarry	1	7	232		*Acropora*	*aff. bushyensis*	1	Average-Poor	z-like	Extant	Extinct	Branching
43	1.8.552	2007	Sanctuary Quarry	1	8	552		*Acropora*	*aff. bushyensis*	1	Average-Poor	z-like	Extant	Extinct	Branching
43	5.-.1458	2007	Lake Quarry	5	2	1458		*Acropora*	*aff. bushyensis*	1	Poor	z-like	Extant	Extinct	Branching
43	SaQ1: 51	2006	Sanctuary Quarry	SaQ	0	51		*Acropora*	*aff. bushyensis*	1	Average-Poor	z-like	Extant	Extinct	Branching
43	SaQ1: 52	2006	Sanctuary Quarry	SaQ	0	52		*Acropora*	*aff. bushyensis*	1	Average	z-like	Extant	Extinct	Branching
75	1.1.7	2007	Sanctuary Quarry	1	1	7		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.1.8	2007	Sanctuary Quarry	1	1	8		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.2.27	2007	Sanctuary Quarry	1	2	27		*Actinacis*	*cf. rollei*	1	Good	z-like	Extinct	Extinct	Branching
75	1.2.31	2007	Sanctuary Quarry	1	2	31		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	1.3.41	2007	Sanctuary Quarry	1	3	41		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.3.42	2007	Sanctuary Quarry	1	3	42		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Branching
75	1.3.64	2007	Sanctuary Quarry	1	3	64		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.3.65	2007	Sanctuary Quarry	1	3	65		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Branching
75	1.3.66	2007	Sanctuary Quarry	1	3	66		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.3.67	2007	Sanctuary Quarry	1	3	67		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.3.72	2007	Sanctuary Quarry	1	3	72		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.4.75	2007	Sanctuary Quarry	1	4	75		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.4.81	2007	Sanctuary Quarry	1	4	81		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.4.91	2007	Sanctuary Quarry	1	4	91		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.4.94	2007	Sanctuary Quarry	1	4	94		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.5.131	2007	Sanctuary Quarry	1	5	131		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.5.137	2007	Sanctuary Quarry	1	5	137		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.5.138	2007	Sanctuary Quarry	1	5	138		*Actinacis*	*cf. rollei*	1	Good-Average	z-like	Extinct	Extinct	Platy
75	1.5.147	2007	Sanctuary Quarry	1	5	147		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.5.147 (b)	2007	Sanctuary Quarry	1	5	47	b	*Actinacis*	*cf. rollei*	1		z-like	Extinct	Extinct	Branching
75	1.5.151	2007	Sanctuary Quarry	1	5	151		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.5.153	2007	Sanctuary Quarry	1	5	153		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.5.166	2007	Sanctuary Quarry	1	5	166		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.6.201	2007	Sanctuary Quarry	1	6	201		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.7.240	2007	Sanctuary Quarry	1	7	240		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Branching
75	1.7.256	2007	Sanctuary Quarry	1	7	256		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.7.268	2007	Sanctuary Quarry	1	7	268		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Branching
75	1.7.273	2007	Sanctuary Quarry	1	7	273		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.7.282	2007	Sanctuary Quarry	1	7	282		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.7.284	2007	Sanctuary Quarry	1	7	284		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.7.306	2007	Sanctuary Quarry	1	7	306		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	1.7.328	2007	Sanctuary Quarry	1	7	328		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Branching
75	1.8.341	2007	Sanctuary Quarry	1	8	341		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.8.342	2007	Sanctuary Quarry	1	8	342		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Branching
75	1.9.369	2007	Sanctuary Quarry	1	9	369		*Actinacis*	*cf. rollei*	1	(specimen is cut in two)	z-like	Extinct	Extinct	Platy
75	2.1.417	2007	Rubbish Dump Quarry	2	1	417		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Platy
75	2.2.468	2007	Rubbish Dump Quarry	2	2	468		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.1.650	2007	Mosque Quarry III	3	1	650		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.1.658	2007	Mosque Quarry III	3	1	658		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.1.665	2007	Mosque Quarry III	3	1	665		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.1.666	2007	Mosque Quarry III	3	1	666		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.2.681	2007	Mosque Quarry III	3	2	681		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.2.682	2007	Mosque Quarry III	3	2	682		*Actinacis*	*cf. rollei*	1	Poor (has part of a plocoid coral on it: Cypahastre	z-like	Extinct	Extinct	Platy
75	3.2.690	2007	Mosque Quarry III	3	2	690		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.2.698	2007	Mosque Quarry III	3	2	698		*Actinacis*	*cf. rollei*	1	Average	z-like	Extinct	Extinct	Platy
75	3.2.700	2007	Mosque Quarry III	3	2	700		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.2.705	2007	Mosque Quarry III	3	2	705		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.2.706	2007	Mosque Quarry III	3	2	706		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.2.715	2007	Mosque Quarry III	3	2	715		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.3.754	2007	Mosque Quarry III	3	3	754		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	3.3.755	2007	Mosque Quarry III	3	3	755		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.3.762	2007	Mosque Quarry III	3	3	762		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.4.769	2007	Mosque Quarry III	3	4	769		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.4.771	2007	Mosque Quarry III	3	4	771		*Actinacis*	*cf. rollei*	1	Poor (has section of Leptoseris on it)	z-like	Extinct	Extinct	Platy
75	3.6.822	2007	Mosque Quarry III	3	6	822		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.6.825	2007	Mosque Quarry III	3	6	825		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	3.6.829	2007	Mosque Quarry III	3	6	829		*Actinacis*	*cf. rollei*	1	Average-Poor	z-like	Extinct	Extinct	Platy
75	4.1.840	2007	Lower Sanctuary Quarry	4	1	840		*Actinacis*	*cf. rollei*	1		z-like	Extinct	Extinct	Platy
75	4.2.928	2007	Lower Sanctuary Quarry	4	2	928		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	4.4.1045	2007	Lower Sanctuary Quarry	4	4	1045		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy
75	4.5.1093	2007	Lower Sanctuary Quarry	4	5	1093		*Actinacis*	*cf. rollei*	1	Poor	z-like	Extinct	Extinct	Platy

75	PO 299	2006	Police Outcrop	PO	0	299		*Actinacis*	*cf. rollei*	1	z-like	Extinct	Extinct	Platy
75	PO: 428	2007	Police Outcrop	PO	0	428		*Actinacis*	*cf. rollei*	1 Good	z-like	Extinct	Extinct	Branching
75	SaQ 161	2006	Sanctuary Quarry	SaQ	0	161		*Actinacis*	*cf. rollei*	1	z-like	Extinct	Extinct	Branching
75	SaQ1: 102	2006	Sanctuary Quarry	SaQ	0	102		*Actinacis*	*cf. rollei*	1 Good	z-like	Extinct	Extinct	Branching
75	SaQ1: 113	2006	Sanctuary Quarry	SaQ	0	113		*Actinacis*	*cf. rollei*	1 Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 119	2006	Sanctuary Quarry	SaQ	0	119		*Actinacis*	*cf. rollei*	1 Good-Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 130	2006	Sanctuary Quarry	SaQ	0	130		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SaQ1: 210	2006	Sanctuary Quarry	SaQ	0	210		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Platy
75	SaQ1: 36	2006	Sanctuary Quarry	SaQ	0	36		*Actinacis*	*cf. rollei*	1 Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 58	2006	Sanctuary Quarry	SaQ	0	58		*Actinacis*	*cf. rollei*	1 Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 60	2006	Sanctuary Quarry	SaQ	0	60		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SaQ1: 61	2006	Sanctuary Quarry	SaQ	0	61		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SaQ1: 62	2006	Sanctuary Quarry	SaQ	0	62		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SaQ1: 63	2006	Sanctuary Quarry	SaQ	0	63		*Actinacis*	*cf. rollei*	1 Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 66	2006	Sanctuary Quarry	SaQ	0	66		*Actinacis*	*cf. rollei*	1 Good-Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 81e	2006	Sanctuary Quarry	SaQ	0	81	e	*Actinacis*	*cf. rollei*	2 Average	z-like	Extinct	Extinct	Branching
75	SaQ1: 91	2006	Sanctuary Quarry	SaQ	0	91		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SaQ2: 140	2006	Sanctuary Quarry	SaQ	0	140		*Actinacis*	*cf. rollei*	1 Poor	z-like	Extinct	Extinct	Branching
75	SaQ2: 156	2006	Sanctuary Quarry	SaQ	0	156		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Branching
75	SRQ1: 12	2006	Sukau Road Quarry	SRQ	0	12		*Actinacis*	*cf. rollei*	1 Poor	z-like	Extinct	Extinct	Branching
75	SRQ1: 7	2006	Sukau Road Quarry	SRQ	0	7		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Platy
75	SRQ1: 8	2006	Sukau Road Quarry	SRQ	0	8		*Actinacis*	*cf. rollei*	1 Average-Poor	z-like	Extinct	Extinct	Platy
61	1.1.11	2007	Sanctuary Quarry	1	1	11		*Actinastrea*	*minutissima*	1 Poor	z-like	Extant	Extinct	Branching
61	1.2.18	2007	Sanctuary Quarry	1	2	18		*Actinastrea*	*minutissima*	1 Poor	z-like	Extant	Extinct	Branching
61	1.5.116	2007	Sanctuary Quarry	1	5	116		*Actinastrea*	*minutissima*	1	z-like	Extant	Extinct	Branching
61	1.5.168	2007	Sanctuary Quarry	1	5	168		*Actinastrea*	*minutissima*	1 Good-Average	z-like	Extant	Extinct	Branching
61	1.6.178	2007	Sanctuary Quarry	1	6	178		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	1.6.194	2007	Sanctuary Quarry	1	6	194		*Actinastrea*	*minutissima*	1	z-like	Extant	Extinct	Branching
61	1.7.224	2007	Sanctuary Quarry	1	7	224		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	1.7.262	2007	Sanctuary Quarry	1	7	262		*Actinastrea*	*minutissima*	1	z-like	Extant	Extinct	Branching
61	1.7.289	2007	Sanctuary Quarry	1	7	289		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	1.8.338	2007	Sanctuary Quarry	1	8	338		*Actinastrea*	*minutissima*	1 Good-Average	z-like	Extant	Extinct	Branching
61	1.8.339	2007	Sanctuary Quarry	1	8	339		*Actinastrea*	*minutissima*	1 Average-Poor	z-like	Extant	Extinct	Branching
61	1.8.353	2007	Sanctuary Quarry	1	8	353		*Actinastrea*	*minutissima*	1 Good	z-like	Extant	Extinct	Branching
61	1.8.363	2007	Sanctuary Quarry	1	8	363		*Actinastrea*	*minutissima*	1 Good	z-like	Extant	Extinct	Branching
61	1.9.380	2007	Sanctuary Quarry	1	9	380		*Actinastrea*	*minutissima*	1 Good	z-like	Extant	Extinct	Branching
61	1.9.390	2007	Sanctuary Quarry	1	9	390		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	SaQ1: 112	2006	Sanctuary Quarry	SaQ	0	112		*Actinastrea*	*minutissima*	1 Average-Poor	z-like	Extant	Extinct	Branching
61	SaQ1: 114	2006	Sanctuary Quarry	SaQ	0	114		*Actinastrea*	*minutissima*	1 Average-Poor	z-like	Extant	Extinct	Branching
61	SaQ1: 116	2006	Sanctuary Quarry	SaQ	0	116		*Actinastrea*	*minutissima*	1 Good-Average	z-like	Extant	Extinct	Branching
61	SaQ1: 133	2006	Sanctuary Quarry	SaQ	0	133		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	SaQ1: 65	2006	Sanctuary Quarry	SaQ	0	65		*Actinastrea*	*minutissima*	1 Average	z-like	Extant	Extinct	Branching
61	SaQ1: 81 f	2006	Sanctuary Quarry	SaQ	0	81	f	*Actinastrea*	*minutissima*	1 Good-Average	z-like	Extant	Extinct	Branching
61	SaQ2: 143	2006	Sanctuary Quarry	SaQ	0	143		*Actinastrea*	*minutissima*	1 Poor	z-like	Extant	Extinct	Branching
61	SaQ2: 144	2006	Sanctuary Quarry	SaQ	0	144		*Actinastrea*	*minutissima*	1	z-like	Extant	Extinct	Branching
61	SRQ1: 21	2006	Sukau Road Quarry	SRQ	0	21		*Actinastrea*	*minutissima*	1 Good	z-like	Extant	Extinct	Branching
61	SRQ1: 9	2006	Sukau Road Quarry	SRQ	0	9		*Actinastrea*	*minutissima*	1 Good	z-like	Extant	Extinct	Branching
47	1.2.23	2007	Sanctuary Quarry	1	2	23		*aff. Cladocora*	*arbuscula*	1 Good	z-like	Extant	Extant	Branching
47	1.3.55	2007	Sanctuary Quarry	1	3	55		*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	1.3.56	2007	Sanctuary Quarry	1	3	56		*aff. Cladocora*	*arbuscula*	1 Good	z-like	Extant	Extant	Branching
47	1.4.74 d	2007	Sanctuary Quarry	1	4	74	d	*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	1.4.79	2007	Sanctuary Quarry	1	4	79		*aff. Cladocora*	*arbuscula*	1 Poor	z-like	Extant	Extant	Branching
47	1.4.97	2007	Sanctuary Quarry	1	4	97		*aff. Cladocora*	*arbuscula*	1 Good	z-like	Extant	Extant	Branching
47	1.5.123	2007	Sanctuary Quarry	1	5	123		*aff. Cladocora*	*arbuscula*	1 Poor	z-like	Extant	Extant	Branching
47	1.5.149	2007	Sanctuary Quarry	1	5	149		*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	1.5.158	2007	Sanctuary Quarry	1	5	158		*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	1.5.162	2007	Sanctuary Quarry	1	5	162		*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	1.7.269	2007	Sanctuary Quarry	1	7	269		*aff. Cladocora*	*arbuscula*	1 Good	z-like	Extant	Extant	Branching
47	1.9.382 d	2007	Sanctuary Quarry	1	9	382	d	*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	4.3.1022 b	2007	Lower Sanctuary Quarry	4	3	1022	b	*aff. Cladocora*	*arbuscula*	1 Good	z-like	Extant	Extant	Branching
47	LSa: 2021	2007	Lower Sanctuary Quarry	LSa	0	2021		*aff. Cladocora*	*arbuscula*	1 Average	z-like	Extant	Extant	Branching
47	PP1: 401 b	2006	Police Outcrop	PO	0	401	b	*aff. Cladocora*	*arbuscula*	2 Good	z-like	Extant	Extant	Branching
48	1.3.39	2007	Sanctuary Quarry	1	3	39		*Alveopora*	*catalai*	1 Poor	z-like	Extant	Extant	Branching
48	1.4.82	2007	Sanctuary Quarry	1	4	82		*Alveopora*	*catalai*	1 Poor	z-like	Extant	Extant	Branching
48	1.5.115	2007	Sanctuary Quarry	1	5	115		*Alveopora*	*catalai*	1 Poor	z-like	Extant	Extant	Branching
48	1.7.235	2007	Sanctuary Quarry	1	7	235		*Alveopora*	*catalai*	1 Poor	z-like	Extant	Extant	Branching
48	1.8.359	2007	Sanctuary Quarry	1	8	359		*Alveopora*	*catalai*	1 Average	z-like	Extant	Extant	Branching
48	5.-.1419	2007	Lake Quarry	5	1	1419		*Alveopora*	*catalai*	1 Poor	z-like	Extant	Extant	Branching
24	1.6.171	2007	Sanctuary Quarry	1	6	171		*Aniscoenia*	*variabilis*	1 Average	z-like	Extinct	Extinct	Massive
24	1.6.180	2007	Sanctuary Quarry	1	6	180		*Aniscoenia*	*variabilis*	1 Average	z-like	Extinct	Extinct	Massive
24	SaQ: 94	2006	Sanctuary Quarry	SaQ	0	94		*Aniscoenia*	*variabilis*	1 Average-Poor	z-like	Extinct	Extinct	Massive
24	SaQ1: 104	2006	Sanctuary Quarry	SaQ	0	104		*Aniscoenia*	*variabilis*	1 Good	z-like	Extinct	Extinct	Massive
99	SaQ 105	2006	Sanctuary Quarry	SaQ	0	105		*Aniscoenia*	*variabilis*	1 (specimen cut into 3 pieces)	z-like	Extinct	Extinct	Massive
67	1.5.136	2007	Sanctuary Quarry	1	5	136		*Antiguastrea*	*cf. cellulosa*	1 Good	z-like	Extinct	Extinct	Massive
67	1.7.261	2007	Sanctuary Quarry	1	7	261		*Antiguastrea*	*cf. cellulosa*	1 Good	z-like	Extinct	Extinct	Massive

79	1.2.14	2007	Sanctuary Quarry	1	2	14		*Antillophyllia*	*sp.*	1 Average	az-like	Extinct	Extinct	Solitary
79	1.2.16	2007	Sanctuary Quarry	1	2	16		*Antillophyllia*	*sp.*	1 Average	az-like	Extinct	Extinct	Solitary
79	1.2.19	2007	Sanctuary Quarry	1	2	19		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.5.150	2007	Sanctuary Quarry	1	5	150		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.7.239	2007	Sanctuary Quarry	1	7	239		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.7.245	2007	Sanctuary Quarry	1	7	245		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.7.274	2007	Sanctuary Quarry	1	7	274		*Antillophyllia*	*sp.*	1 Average	az-like	Extinct	Extinct	Solitary
79	1.7.307	2007	Sanctuary Quarry	1	7	307		*Antillophyllia*	*sp.*	1 Average	az-like	Extinct	Extinct	Solitary
79	1.7.321	2007	Sanctuary Quarry	1	7	321		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.7.330	2007	Sanctuary Quarry	1	7	330		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.7.332	2007	Sanctuary Quarry	1	7	332		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	1.8.361	2007	Sanctuary Quarry	1	8	361		*Antillophyllia*	*sp.*	1 Poor	az-like	Extinct	Extinct	Solitary
79	1.9.388	2007	Sanctuary Quarry	1	9	388		*Antillophyllia*	*sp.*	1 Average	az-like	Extinct	Extinct	Solitary
79	SaQ1: 134	2006	Sanctuary Quarry	SaQ	0	134		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
79	SaQ1: 147	2006	Sanctuary Quarry	SaQ	0	147		*Antillophyllia*	*sp.*	1 Average-Poor	az-like	Extinct	Extinct	Solitary
13	1.7.255	2007	Sanctuary Quarry	1	7	255		*Astreopora*	*cf. expansa/rutteni*	1 Average	z-like	Extant	Extant	Platy
13	1.7.301	2007	Sanctuary Quarry	1	7	301		*Astreopora*	*cf. expansa/rutteni*	1 Average	z-like	Extant	Extant	Platy
13	SaQ1: 83	2006	Sanctuary Quarry	SaQ	0	83		*Astreopora*	*cf. expansa/rutteni*	1 Average	z-like	Extant	Extant	Platy
100	1.2.35	2007	Sanctuary Quarry	1	2	35		*Astreopora*	*sp.*	1 (specimen is cut into 3 pieces)	z-like	Extant	Extinct	Massive
58	3.2.674	2007	Mosque Quarry III	3	2	674		*Astrocoenia*	*sp. 1*	1 Average	z-like	Extant	Extinct	Platy
58	4.1.845	2007	Lower Sanctuary Quarry	4	1	845		*Astrocoenia*	*sp. 1*	1 Good-Average	z-like	Extant	Extinct	Platy
58	4.1.858	2007	Lower Sanctuary Quarry	4	1	858		*Astrocoenia*	*sp. 1*	1 Good-Average	z-like	Extant	Extinct	Platy
58	4.2.897	2007	Lower Sanctuary Quarry	4	2	897		*Astrocoenia*	*sp. 1*	1 Good-Average	z-like	Extant	Extinct	Platy
58	4.8.1273	2007	Lower Sanctuary Quarry	4	8	1273		*Astrocoenia*	*sp. 1*	1 Good-Average	z-like	Extant	Extinct	Platy
58	5.-.1400	2007	Lake Quarry	5	7	1400		*Astrocoenia*	*sp. 1*	1 Average	z-like	Extant	Extinct	Platy
35	1.4.111	2007	Sanctuary Quarry	1	4	111		*Barabattoia*	*aff. amicorum*	1	z-like	Extant	Extinct	Massive
78	4.4.1034	2007	Lower Sanctuary Quarry	4	4	1034		*Cantharellus*	*cf. noumae*	1 Average	z-like	Extant	Extant	Solitary
78	SaQ2: 142	2006	Sanctuary Quarry	SaQ	0	142		*Cantharellus*	*cf. noumae*	1 Good-Average	z-like	Extant	Extant	Solitary
88	4.4.1029	2007	Lower Sanctuary Quarry	4	4	1029		*Caryophyllia*	*cf. abrupta*	1	az-like	Extant	Extant	Solitary
87	4.7.1196	2007	Lower Sanctuary Quarry	4	7	1196		*Caryophyllia*	*sp.*	1	az-like	Extant	Extinct	Solitary
83	LSa2: 234	2006	Lower Sanctuary Quarry	LSa	0	234		*Caryophyllia*	*sp.*	1	az-like	Extant	Extinct	Solitary
54	4.4.1033	2007	Lower Sanctuary Quarry	4	4	1033		*Caulastrea*	*aff. farsis*	1	z-like	Extant	Extinct	Branching
54	4.4.1055 b	2007	Lower Sanctuary Quarry	4	4	1055 b	b	*Caulastrea*	*aff. farsis*	1	z-like	Extant	Extinct	Branching
54	4.7.1199	2007	Lower Sanctuary Quarry	4	7	1199		*Caulastrea*	*aff. farsis*	6	z-like	Extant	Extinct	Branching
54	5.-.1343	2007	Lake Quarry	5	0	1343		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1344	2007	Lake Quarry	5	0	1344		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1345	2007	Lake Quarry	5	0	1345		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1346	2007	Lake Quarry	5	0	1346		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1347	2007	Lake Quarry	5	0	1347		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1348	2007	Lake Quarry	5	0	1348		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1349	2007	Lake Quarry	5	0	1349		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1350	2007	Lake Quarry	5	0	1350		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1351	2007	Lake Quarry	5	0	1351		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1352	2007	Lake Quarry	5	0	1352		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1353	2007	Lake Quarry	5	0	1353		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1354	2007	Lake Quarry	5	0	1354		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1355	2007	Lake Quarry	5	0	1355		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	5.-.1356	2007	Lake Quarry	5	0	1356		*Caulastrea*	*aff. farsis*	1 Good (is all from one specimen that broke apart)	z-like	Extant	Extinct	Branching
54	LSaQ: 2041	2007	Lower Sanctuary Quarry	LSa	0	2041		*Caulastrea*	*aff. farsis*	1	z-like	Extant	Extinct	Branching
53	1.2.25	2007	Sanctuary Quarry	1	2	25		*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	1.3.57	2007	Sanctuary Quarry	1	3	57		*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	1.5.118	2007	Sanctuary Quarry	1	5	118		*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	1.7.251	2007	Sanctuary Quarry	1	7	251		*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	1.7.337 (a)	2006	Sanctuary Quarry	1	7	337	a	*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	LSa2: 225 l	2006	Lower Sanctuary Quarry	LSa	0	225	l	*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	LSa2: 243	2006	Lower Sanctuary Quarry	LSa	0	243		*Caulastrea*	*sp. 1*	1	z-like	Extant	Extinct	Branching
53	3: 30/10/06 b (2(	2006	Sanctuary Quarry	SaQ	0	2040	b	*Caulastrea*	*sp. 1*	3 Average	z-like	Extant	Extinct	Branching
102	5.-.1448	2007	Lake Quarry	5	0	1448		*Ceratocyathus*	*sp.*	1	az-like	Extinct	Extinct	Solitary
2	SaQ1: 137	2006	Sanctuary Quarry	SaQ	0	137		*Colpophyllia*	*aff. natans*	1 Average - poor	z-like	Extant	Extinct	Massive
93	LSa: 2031	2007	Lower Sanctuary Quarry	LSa	0	2031		*Cynarina*	*sp.*	1	az-like	Extant	Extinct	Solitary
8	LQ: 2029 a	2007	Lake Quarry	LQ	0	2029	a	*Cynarina*	*sp. 1 (cf. lacrymalis V&D)*	1 Average	az-like	Extant	Extant	Solitary
9	1.5.146	2007	Sanctuary Quarry	1	5	146		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good	az-like	Extant	Extant	Solitary
9	1.7.244	2007	Sanctuary Quarry	1	7	244		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Poor	az-like	Extant	Extant	Solitary
9	4.2.1287	2007	Lower Sanctuary Quarry	4	2	1287		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good-Average	az-like	Extant	Extant	Solitary
9	4.3.1000	2007	Lower Sanctuary Quarry	4	3	1000		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Average-Poor	az-like	Extant	Extant	Solitary
9	4.5.1073	2007	Lower Sanctuary Quarry	4	5	1073		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good-Average	az-like	Extant	Extant	Solitary
9	5.-.1412	2007	Lake Quarry	5	8	1412		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good	az-like	Extant	Extant	Solitary
9	5.-.1449	2007	Lake Quarry	5	1	1449		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Poor	az-like	Extant	Extant	Solitary
9	LQ: 2029 b	2007	Lake Quarry	LQ	0	2029	b	*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good-Average	az-like	Extant	Extant	Solitary
9	LSa: 2020	2007	Lower Sanctuary Quarry	LSa	0	2020		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good-Average	az-like	Extant	Extant	Solitary
9	LSa1: 2027 b	2007	Lower Sanctuary Quarry	LSa	0	2027	b	*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good (is ref. specimen for Oulophyllia sp. 2)	az-like	Extant	Extant	Solitary
9	LSa1: 213 b	2006	Lower Sanctuary Quarry	LSa	0	213	b	*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Good	az-like	Extant	Extant	Solitary
9	LSa2: 235	2006	Lower Sanctuary Quarry	LSa	0	235		*Cynarina*	*sp. 2. (cf. lacrymalis E&H)*	1 Average	az-like	Extant	Extant	Solitary
95	1.4.100	2007	Sanctuary Quarry	1	4	100		*Cynarina*	*sp. 3*	1	az-like	Extant	Extinct	Solitary
15	1.2.32	2007	Sanctuary Quarry	1	2	32		*Cyphastrea*	*cf. japonica*	1 Poor	z-like	Extant	Extant	Branching

15	1.2.36	2007	Sanctuary Quarry	1	2	36		*Cyphastrea*	*cf. japonica*	1		z-like	Extant	Extant	Branching
15	1.2.37	2007	Sanctuary Quarry	1	2	37		*Cyphastrea*	*cf. japonica*	1	Poor	z-like	Extant	Extant	Branching
15	SaQ1: 71	2006	Sanctuary Quarry	SaQ	0	71		*Cyphastrea*	*cf. japonica*	1	Good	z-like	Extant	Extant	Branching
41	1.4.74	2007	Sanctuary Quarry	1	4	74		*Dictyaraea*	*?sp.*	3	Average	z-like	Extinct	Extinct	Branching
70	1.4.74 (b)	2007	Sanctuary Quarry	1	4	174	b	*Dictyaraea*	*aff. micrantha*	3		z-like	Extinct	Extinct	Branching
70	2.5.555 b	2007	Rubbish Dump Quarry	2	5	555	b	*Dictyaraea*	*aff. micrantha*	4	Good	z-like	Extinct	Extinct	Branching
70	4.1.859 (c)(ii)	2007	Lower Sanctuary Quarry	4	1	859	c (ii)	*Dictyaraea*	*aff. micrantha*	1		z-like	Extinct	Extinct	Branching
70	4.1.859 (b)	2007	Lower Sanctuary Quarry	4	1	859	b	*Dictyaraea*	*aff. micrantha*	1		z-like	Extinct	Extinct	Branching
70	4.5.1102 (b) (i)	2007	Lower Sanctuary Quarry	4	5	1102	b (i)	*Dictyaraea*	*aff. micrantha*	1		z-like	Extinct	Extinct	Branching
70	4.6.1169	2007	Lower Sanctuary Quarry	4	6	1169		*Dictyaraea*	*aff. micrantha*	1	Average	z-like	Extinct	Extinct	Branching
70	4.6.1192 (b) (ii)	2007	Lower Sanctuary Quarry	4	6	1192	b (ii)	*Dictyaraea*	*aff. micrantha*	3		z-like	Extinct	Extinct	Branching
70	5.-.1431 (b)	2007	Lake Quarry	5	1	1431	b	*Dictyaraea*	*aff. micrantha*	1		z-like	Extinct	Extinct	Branching
70	LSa 402 (a)	2006	Lower Sanctuary Quarry	LSa	0	402	a	*Dictyaraea*	*aff. micrantha*	1		z-like	Extinct	Extinct	Branching
70	LSa: 2032	2007	Lower Sanctuary Quarry	LSa	0	2032		*Dictyaraea*	*aff. micrantha*	1	Good-Average	z-like	Extinct	Extinct	Branching
70	LSa2: 225 e (i)	2006	Lower Sanctuary Quarry	LSa	0	225	e (i)	*Dictyaraea*	*aff. micrantha*	1	Average-Poor	z-like	Extinct	Extinct	Branching
70	LSa2: 225 h	2006	Lower Sanctuary Quarry	LSa	0	225	h	*Dictyaraea*	*aff. micrantha*	1	Average	z-like	Extinct	Extinct	Branching
70	SW1: 281/400 f	2006	Station West Quarry	SW	0	281/400	f	*Dictyaraea*	*aff. micrantha*	1	Average	z-like	Extinct	Extinct	Branching
70	W1: 281/400 f a (	2006	Station West Quarry	SW	0	281/400	f a (i)	*Dictyaraea*	*aff. micrantha*	1	Average-Poor	z-like	Extinct	Extinct	Branching
70	PO: 401 (e)	2006	Police Outcrop	PO	0	401	e	*Dictyaraea*	*aff. micrantha*	1	Good	z-like	Extinct	Extinct	Branching
68	1.1.2	2007	Sanctuary Quarry	1	1	2		*Diploastrea*	*aff. coronata*	1		z-like	Extant	Extinct	Massive
50	4.2.894	2007	Lower Sanctuary Quarry	4	2	894		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.2.912	2007	Lower Sanctuary Quarry	4	2	912		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.3.940	2007	Lower Sanctuary Quarry	4	3	940		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.4.1028	2007	Lower Sanctuary Quarry	4	4	1028		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.4.1030	2007	Lower Sanctuary Quarry	4	4	1030		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.4.1039	2007	Lower Sanctuary Quarry	4	4	1039		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.6.1119	2007	Lower Sanctuary Quarry	4	6	1119		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.6.1128	2007	Lower Sanctuary Quarry	4	6	1128		*Echinophyllia*	*cf. echinata*	1	Good-Average	z-like	Extant	Extant	Platy
50	4.7.1201	2007	Lower Sanctuary Quarry	4	7	1201		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.7.1219	2007	Lower Sanctuary Quarry	4	7	1219		*Echinophyllia*	*cf. echinata*	1	Poor	z-like	Extant	Extant	Platy
50	4.8.1248	2007	Lower Sanctuary Quarry	4	8	1248		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	4.8.1271	2007	Lower Sanctuary Quarry	4	8	1271		*Echinophyllia*	*cf. echinata*	1	Good	z-like	Extant	Extant	Platy
50	5.-.1406	2007	Lake Quarry	5	4	1406		*Echinophyllia*	*cf. echinata*	1	Good-Average	z-like	Extant	Extant	Platy
50	5.-.1407	2007	Lake Quarry	5	1	1407		*Echinophyllia*	*cf. echinata*	1	Good-Average	z-like	Extant	Extant	Platy
50	5.-.1410	2007	Lake Quarry	5	8	1410		*Echinophyllia*	*cf. echinata*	1	Good-Average	z-like	Extant	Extant	Platy
50	5.-.1433	2007	Lake Quarry	5	1	1433		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	SW1: 289	2006	Station West Quarry	SW	0	289		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
50	SW1: 290	2006	Station West Quarry	SW	0	290		*Echinophyllia*	*cf. echinata*	1		z-like	Extant	Extant	Platy
62	PP1: 314	2006	Police Outcrop	PO	0	314		*Echinophyllia*	*sp.*	1	Average	z-like	Extant	Extinct	Platy
12	4.2.904	2007	Lower Sanctuary Quarry	4	2	904		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.2.904 b	2007	Lower Sanctuary Quarry	4	2	904	b	*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.938	2007	Lower Sanctuary Quarry	4	3	938		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.948	2007	Lower Sanctuary Quarry	4	3	948		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.949	2007	Lower Sanctuary Quarry	4	3	949		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.957	2007	Lower Sanctuary Quarry	4	3	957		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.963	2007	Lower Sanctuary Quarry	4	3	963		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.964	2007	Lower Sanctuary Quarry	4	3	964		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.965	2007	Lower Sanctuary Quarry	4	3	965		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.992	2007	Lower Sanctuary Quarry	4	3	992		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.3.997	2007	Lower Sanctuary Quarry	4	3	997		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.5.1063	2007	Lower Sanctuary Quarry	4	5	1063		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.5.1066	2007	Lower Sanctuary Quarry	4	5	1066		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.5.1069	2007	Lower Sanctuary Quarry	4	5	1069		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.5.1071	2007	Lower Sanctuary Quarry	4	5	1071		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.5.1094	2007	Lower Sanctuary Quarry	4	5	1094		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.6.1107	2007	Lower Sanctuary Quarry	4	6	1107		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.6.1114	2007	Lower Sanctuary Quarry	4	6	1114		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.8.1235	2007	Lower Sanctuary Quarry	4	8	1235		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.8.1236	2007	Lower Sanctuary Quarry	4	8	1236		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.8.1256	2007	Lower Sanctuary Quarry	4	8	1256		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	4.8.1262	2007	Lower Sanctuary Quarry	4	8	1262		*Echinopora*	*aff. pelarangensis*	1		z-like	Extant	Extinct	Platy
12	LSa: 2002	2007	Lower Sanctuary Quarry	LSa	0	2002		*Echinopora*	*aff. pelarangensis*	1	Good	z-like	Extant	Extinct	Platy
12	LSa: 2003	2007	Lower Sanctuary Quarry	LSa	0	2003		*Echinopora*	*aff. pelarangensis*	1	Good	z-like	Extant	Extinct	Platy
32	1.8.340	2007	Sanctuary Quarry	1	8	340		*Echinopora*	*pelarangensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
32	5.-.1374	2007	Lake Quarry	5	8	1374		*Echinopora*	*pelarangensis*	1	Average	z-like	Extant	Extinct	Platy
101	LSa 241	2006	Lower Sanctuary Quarry	LSa	0	241		*Echinopora*	*sp.*	1		z-like	Extant	Extinct	Platy
36	1.6.174	2007	Sanctuary Quarry	1	6	174		*Favia*	*cf. lizardensis*	1		z-like	Extant	Extant	Massive
33	1.1.1	2007	Sanctuary Quarry	1	1	1		*Favia*	*cf.laxa*	1	Good-average	z-like	Extant	Extant	Massive
22	1.7.229	2007	Sanctuary Quarry	1	7	229		*Favites*	*aff. chinensis*	1	Average-Poor	z-like	Extant	Extinct	Massive
22	1.7.234	2007	Sanctuary Quarry	1	7	234		*Favites*	*aff. chinensis*	1	Poor	z-like	Extant	Extinct	Massive
22	SaQ1: 128	2006	Sanctuary Quarry	SaQ	0	128		*Favites*	*aff. chinensis*	1	Good	z-like	Extant	Extinct	Massive
21	1.5.140	2007	Sanctuary Quarry	1	5	140		*Favites*	*cf. oligocenica*	1	Good-Average	z-like	Extant	Extinct	Massive
21	1.7.228	2007	Sanctuary Quarry	1	7	228		*Favites*	*cf. oligocenica*	1	Average	z-like	Extant	Extinct	Massive
21	2.3.494	2007	Rubbish Dump Quarry	2	3	494		*Favites*	*cf. oligocenica*	1	Poor	z-like	Extant	Extinct	Massive
21	4.3.937	2007	Lower Sanctuary Quarry	4	3	937		*Favites*	*cf. oligocenica*	1	Poor	z-like	Extant	Extinct	Massive

21	4.3.954	2007	Lower Sanctuary Quarry	4	3	954		*Favites*	*cf. oligocenica*	1	Average	z-like	Extant	Extinct	Massive
21	4.3.968	2007	Lower Sanctuary Quarry	4	3	968		*Favites*	*cf. oligocenica*	1	Average	z-like	Extant	Extinct	Massive
21	4.5.1074	2007	Lower Sanctuary Quarry	4	5	1074		*Favites*	*cf. oligocenica*	1	Average-Poor	z-like	Extant	Extinct	Massive
90	LSa1: 78	2006	Lower Sanctuary Quarry	LSa	0	78		*Fungia*	*(Danafungia) aff. horrida*	1		az-like	Extant	Extinct	Solitary
92	4.3.960	2007	Lower Sanctuary Quarry	4	3	960		*FUNGIID1*	*sp. 1*	1		az-like	Extinct	Extinct	Solitary
94	LQ: 2018	2007	Lake Quarry	LQ	0	2018		*FUNGIID1*	*sp. 2*	1		az-like	Extinct	Extinct	Solitary
92	2.7.583	2007	Rubbish Dump Quarry	2	7	583		*FUNGIID2*	*sp.*	1		az-like	Extinct	Extinct	Solitary
49	LSa: 2017	2007	Lower Sanctuary Quarry	LSa	0	2017		*Fungophyllia*	*monstrosa*	1	Good	az-like	Extinct	Extinct	Solitary
91	1.-.14 a	2007	Sanctuary Quarry	1	0	14	a	*Fungophyllia*	*sp.*	1		az-like	Extinct	Extinct	Solitary
14	1.3.58	2007	Sanctuary Quarry	1	3	58		*Galaxea*	*aff. elegantissima*	1	Average-poor	z-like	Extant	Extinct	Platy
14	3.1.671	2007	Mosque Quarry III	3	1	671		*Galaxea*	*aff. elegantissima*	1	Good	z-like	Extant	Extinct	Platy
14	LSa1: 196	2006	Lower Sanctuary Quarry	LSa	0	196		*Galaxea*	*aff. elegantissima*	1	Average	z-like	Extant	Extinct	Platy
14	PO: 416	2007	Police Outcrop	PO	0	416		*Galaxea*	*aff. elegantissima*	1	Average	z-like	Extant	Extinct	Platy
30	PO: 418	2007	Police Outcrop	PO	0	418		*Gardineroseris*	*aff. planulata*	1	Good	z-like	Extant	Extinct	Platy
30	PP1: 297	2006	Police Outcrop	PO	0	297		*Gardineroseris*	*aff. planulata*	1	Good	z-like	Extant	Extinct	Platy
4	1.1.9	2007	Sanctuary Quarry	1	1	9		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	1.7.254 b	2007	Sanctuary Quarry	1	7	254	b	*Goniastrea*	*aff. australensis*	4	Average	z-like	Extant	Extinct	Platy
4	1.7.285	2007	Sanctuary Quarry	1	7	285		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	1.8.362	2007	Sanctuary Quarry	1	8	362		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.1.422	2007	Rubbish Dump Quarry	2	1	422		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	2.1.423	2007	Rubbish Dump Quarry	2	1	423		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	2.1.426	2007	Rubbish Dump Quarry	2	1	426		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.1.429	2007	Rubbish Dump Quarry	2	1	429		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	2.2.473	2007	Rubbish Dump Quarry	2	2	473		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	2.2.475	2007	Rubbish Dump Quarry	2	2	475		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.3.479	2007	Rubbish Dump Quarry	2	3	479		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.3.490	2007	Rubbish Dump Quarry	2	3	490		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.3.491	2007	Rubbish Dump Quarry	2	3	491		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	2.3.502	2007	Rubbish Dump Quarry	2	3	502		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.3.508	2007	Rubbish Dump Quarry	2	3	508		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.4.519	2007	Rubbish Dump Quarry	2	4	519		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	2.4.535	2007	Rubbish Dump Quarry	2	4	535		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.4.537	2007	Rubbish Dump Quarry	2	4	537		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	2.5.545	2007	Rubbish Dump Quarry	2	5	545		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.5.547	2007	Rubbish Dump Quarry	2	5	547		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	2.7.605	2007	Rubbish Dump Quarry	2	7	605		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	4.1.836	2007	Lower Sanctuary Quarry	4	1	836		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	4.1.857	2007	Lower Sanctuary Quarry	4	1	857		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	4.1.861	2007	Lower Sanctuary Quarry	4	1	861		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	4.1.862	2007	Lower Sanctuary Quarry	4	1	862		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	4.1.873	2007	Lower Sanctuary Quarry	4	1	873		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	4.1.878	2007	Lower Sanctuary Quarry	4	1	878		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	4.2.925	2007	Lower Sanctuary Quarry	4	2	925		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	4.2.927	2007	Lower Sanctuary Quarry	4	2	927		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	4.2.934	2007	Lower Sanctuary Quarry	4	2	934		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	4.2.935	2007	Lower Sanctuary Quarry	4	2	935		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	4.3.985	2007	Lower Sanctuary Quarry	4	3	985		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	4.6.1105	2007	Lower Sanctuary Quarry	4	6	1105		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	4.6.1130	2007	Lower Sanctuary Quarry	4	6	1130		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	4.6.1150	2007	Lower Sanctuary Quarry	4	6	1150		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	4.6.1156	2007	Lower Sanctuary Quarry	4	6	1156		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	4.6.1164	2007	Lower Sanctuary Quarry	4	6	1164		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	4.6.1170	2007	Lower Sanctuary Quarry	4	6	1170		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	4.7.1214	2007	Lower Sanctuary Quarry	4	7	1214		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	4.8.1284	2007	Lower Sanctuary Quarry	4	8	1284		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	5.-.1301	2007	Lake Quarry	5	8	1301		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	5.-.1302	2007	Lake Quarry	5	2	1302		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	5.-.1303	2007	Lake Quarry	5	7	1303		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	5.-.1304	2007	Lake Quarry	5	6	1304		*Goniastrea*	*aff. australensis*	1	Average - Poor	z-like	Extant	Extinct	Platy
4	5.-.1390.	2007	Lake Quarry	5	4	1390		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	5.-.1391	2007	Lake Quarry	5	4	1391		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	5.-.1392	2007	Lake Quarry	5	7	1392		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	LSa1: 199	2006	Lower Sanctuary Quarry	LSa	0	199		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	LSa1: 2027	2007	Lower Sanctuary Quarry	LSa	0	2027		*Goniastrea*	*aff. australensis*	1	Good	z-like	Extant	Extinct	Platy
4	LSa1: 206	2006	Lower Sanctuary Quarry	LSa	0	206		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	PP1: 217	2006	Police Outcrop	PO	0	217		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	PP1: 313	2006	Police Outcrop	PO	0	313		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	PP1: 324	2006	Police Outcrop	PO	0	324		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	PP1: 325	2006	Police Outcrop	PO	0	325		*Goniastrea*	*aff. australensis*	1	Good - Average	z-like	Extant	Extinct	Platy
4	PP1: 326	2006	Police Outcrop	PO	0	326		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy
4	SaQ1: 123	2006	Sanctuary Quarry	SaQ	0	123		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	SaQ1: 125	2006	Sanctuary Quarry	SaQ	0	125		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	SaQ1: 98	2006	Sanctuary Quarry	SaQ	0	98		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	SW1: 250	2006	Station West Quarry	SW	0	250		*Goniastrea*	*aff. australensis*	1	Poor	z-like	Extant	Extinct	Platy
4	SW1: 282	2006	Station West Quarry	SW	0	282		*Goniastrea*	*aff. australensis*	1	Average	z-like	Extant	Extinct	Platy

66	1.2.28	2007	Sanctuary Quarry	1	2	28		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	1.6.200	2007	Sanctuary Quarry	1	6	200		*Goniopora*	*aff. djboutiensis*	1	Good-Average	z-like	Extant	Extinct	Platy
66	1.7.310	2007	Sanctuary Quarry	1	7	310		*Goniopora*	*aff. djboutiensis*	1	Poor	z-like	Extant	Extinct	Platy
66	1.9.373	2007	Sanctuary Quarry	1	9	373		*Goniopora*	*aff. djboutiensis*	1	Good-Average	z-like	Extant	Extinct	Platy
66	2.2.471	2007	Rubbish Dump Quarry	2	2	471		*Goniopora*	*aff. djboutiensis*	1	Good-Average	z-like	Extant	Extinct	Platy
66	2.6.568	2007	Rubbish Dump Quarry	2	6	568		*Goniopora*	*aff. djboutiensis*	1	Good-Average	z-like	Extant	Extinct	Platy
66	3.1.663	2007	Mosque Quarry III	3	1	663		*Goniopora*	*aff. djboutiensis*	1	Poor	z-like	Extant	Extinct	Platy
66	3.1.670	2007	Mosque Quarry III	3	1	670		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	3.2.708	2007	Mosque Quarry III	3	2	708		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	3.3.745	2007	Mosque Quarry III	3	3	745		*Goniopora*	*aff. djboutiensis*	1	Poor	z-like	Extant	Extinct	Platy
66	3.4.764	2007	Mosque Quarry III	3	4	764		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	3.4.766	2007	Mosque Quarry III	3	4	766		*Goniopora*	*aff. djboutiensis*	1	Average	z-like	Extant	Extinct	Platy
66	4.7.1210	2007	Lower Sanctuary Quarry	4	7	1210		*Goniopora*	*aff. djboutiensis*	1	Average	z-like	Extant	Extinct	Platy
66	LSaQ2: 220	2006	Lower Sanctuary Quarry	LSa	0	220		*Goniopora*	*aff. djboutiensis*	1	Poor	z-like	Extant	Extinct	Platy
66	SaQ2: 2038	2006	Sanctuary Quarry	SaQ	0	2038		*Goniopora*	*aff. djboutiensis*	1	Poor	z-like	Extant	Extinct	Platy
66	SW1: 2033	2006	Station West Quarry	SW	0	2033		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	SW1: 279	2006	Station West Quarry	SW	0	279		*Goniopora*	*aff. djboutiensis*	1	Average-Poor	z-like	Extant	Extinct	Platy
66	SW1: 284	2006	Station West Quarry	SW	0	284		*Goniopora*	*aff. djboutiensis*	1	Good	z-like	Extant	Extinct	Platy
66	SW1: 285	2006	Station West Quarry	SW	0	285		*Goniopora*	*aff. djboutiensis*	1	Average	z-like	Extant	Extinct	Platy
66	1.5.130	2007	Sanctuary Quarry	1	5	130		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.1.410	2007	Rubbish Dump Quarry	2	1	410		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.1.433	2007	Rubbish Dump Quarry	2	1	433		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.1.446	2007	Rubbish Dump Quarry	2	1	446		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.1.450	2007	Rubbish Dump Quarry	2	1	450		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.1.452	2007	Rubbish Dump Quarry	2	1	452		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.3.501	2007	Rubbish Dump Quarry	2	3	501		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.4.520	2007	Rubbish Dump Quarry	2	4	520		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.4.529	2007	Rubbish Dump Quarry	2	4	529		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.4.533	2007	Rubbish Dump Quarry	2	4	533		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.5.553	2007	Rubbish Dump Quarry	2	5	553		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.5.554	2007	Rubbish Dump Quarry	2	5	554		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	2.7.588	2007	Rubbish Dump Quarry	2	7	588		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
66	4.5.1082	2007	Lower Sanctuary Quarry	4	5	1082		*Goniopora*	*aff. djiboutiensis*	1		z-like	Extant	Extinct	Platy
64	5.-.1414	2007	Lake Quarry	5	7	1414		*Goniopora*	*aff. stuchburyi*	1		z-like	Extant	Extinct	Platy
64	PO 432	2006	Police Outcrop	PO	0	432		*Goniopora*	*aff. stuchburyi*	1		z-like	Extant	Extinct	Platy
64	PO: 431	2007	Police Outcrop	PO	0	431		*Goniopora*	*aff. stuchburyi*	1	Good-Average	z-like	Extant	Extinct	Platy
65	1.4.108	2007	Sanctuary Quarry	1	4	108		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
65	4.6.1151	2007	Lower Sanctuary Quarry	4	6	1151		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
65	LSa2: 242	2006	Lower Sanctuary Quarry	LSa	0	242		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
65	MQ III: 2025	2007	Mosque Quarry III	MQ3	0	2025		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
65	SW1: 263	2006	Station West Quarry	SW	0	263		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
65	SW1: 264	2006	Station West Quarry	SW	0	264		*Goniopora*	*cf. stuchburyi*	1		z-like	Extant	Extant	Encrusting
69	1.5.112	2007	Sanctuary Quarry	1	5	112		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	1.5.126	2007	Sanctuary Quarry	1	5	126		*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	1.6.205	2007	Sanctuary Quarry	1	6	205		*Goniopora*	*fruticosa*	1	Average	z-like	Extant	Extant	Branching
69	1.7.243 a	2007	Sanctuary Quarry	1	7	243	a	*Goniopora*	*fruticosa*	1	Good-Average	z-like	Extant	Extant	Branching
69	1.7.243 b	2007	Sanctuary Quarry	1	7	243	b	*Goniopora*	*fruticosa*	1	Good-Average	z-like	Extant	Extant	Branching
69	1.7.243 c	2007	Sanctuary Quarry	1	7	243	c	*Goniopora*	*fruticosa*	1	Average	z-like	Extant	Extant	Branching
69	1.7.243 d	2007	Sanctuary Quarry	1	7	243	d	*Goniopora*	*fruticosa*	1	Good-Average	z-like	Extant	Extant	Branching
69	1.7.253 b	2007	Sanctuary Quarry	1	7	253	b	*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	1.7.253 j	2007	Sanctuary Quarry	1	7	253	j	*Goniopora*	*fruticosa*	1	Average	z-like	Extant	Extant	Branching
69	1.7.263	2007	Sanctuary Quarry	1	7	263		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	4.1.859 a (i)	2007	Lower Sanctuary Quarry	4	1	859	a (i)	*Goniopora*	*fruticosa*	7	Poor	z-like	Extant	Extant	Branching
69	4.2.917 d	2007	Lower Sanctuary Quarry	4	2	917	d	*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	4.4.1055	2007	Lower Sanctuary Quarry	4	4	1055		*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	5.-.1454	2007	Lake Quarry	5	2	1454		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	5.-.1455	2007	Lake Quarry	5	1	1455		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	5.-.1456	2007	Lake Quarry	5	1	1456		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	SaQ1: 115	2006	Sanctuary Quarry	SaQ	0	115		*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	SaQ1: 85	2006	Sanctuary Quarry	SaQ	0	85		*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	SaQ1: 86	2006	Sanctuary Quarry	SaQ	0	86		*Goniopora*	*fruticosa*	1	Average-Poor	z-like	Extant	Extant	Branching
69	SW1: 273	2006	Station West Quarry	SW	0	273		*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	SW1: 400 c (i)	2006	Station West Quarry	SW	0	400	c (i)	*Goniopora*	*fruticosa*	1	Poor	z-like	Extant	Extant	Branching
69	SW1: 400 c (ii)	2006	Station West Quarry	SW	0	400	c (ii)	*Goniopora*	*fruticosa*	1	Good-Average	z-like	Extant	Extant	Branching
27	LQ: 2014	2007	Lake Quarry	LQ	0	2014		*Hydnophora*	*aff. exesa*	1		z-like	Extant	Extinct	Platy
27	LQ/LSaQ: 2026	2007	Lake Quarry/Lower Sanct	LQ	0	2026		*Hydnophora*	*aff. exesa*	1		z-like	Extant	Extinct	Platy
27	LQ/LSaQ: 2039	2007	Lake Quarry/Lower Sanct	LQ	0	2039		*Hydnophora*	*aff. exesa*	1		z-like	Extant	Extinct	Platy
26	PP1: 323	2006	Police Outcrop	PO	0	323		*Hydnophora*	*aff. microconus*	1	Good	z-like	Extant	Extinct	Platy
26	PP1: 330	2006	Police Outcrop	PO	0	330		*Hydnophora*	*aff. microconus*	1	Good	z-like	Extant	Extinct	Platy
1	1.2.33	2007	Sanctuary Quarry	1	2	33		*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	1.3.44	2007	Sanctuary Quarry	1	3	44		*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	1.3.51	2007	Sanctuary Quarry	1	3	51		*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	1.7.288	2007	Sanctuary Quarry	1	7	288		*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	1.7.292	2007	Sanctuary Quarry	1	7	292		*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	1.7.323	2007	Sanctuary Quarry	1	7	323		*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy

1	2.1.403	2007	Rubbish Dump Quarry	2	1	403	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	2.1.405	2007	Rubbish Dump Quarry	2	1	405	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	2.1.406	2007	Rubbish Dump Quarry	2	1	406	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	2.1.408	2007	Rubbish Dump Quarry	2	1	408	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	2.3.495	2007	Rubbish Dump Quarry	2	3	495	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	2.5.552	2007	Rubbish Dump Quarry	2	5	552	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	3.2.717	2007	Mosque Quarry III	3	2	717	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	4.1.849	2007	Lower Sanctuary Quarry	4	1	849	*Hydnophora*	*cf. solidior*	1	Average - poor... ?in grp	z-like	Extant	Extinct	Platy
1	4.1.864	2007	Lower Sanctuary Quarry	4	1	864	*Hydnophora*	*cf. solidior*	1	Average (lots of coralline algae & foram overgrow	z-like	Extant	Extinct	Platy
1	4.1.867	2007	Lower Sanctuary Quarry	4	1	867	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	4.1.874	2007	Lower Sanctuary Quarry	4	1	874	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	4.2.1010	2007	Lower Sanctuary Quarry	4	2	1010	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.2.884	2007	Lower Sanctuary Quarry	4	2	884	*Hydnophora*	*cf. solidior*	1	Good... ?in grp	z-like	Extant	Extinct	Platy
1	4.2.923	2007	Lower Sanctuary Quarry	4	2	923	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.2.932	2007	Lower Sanctuary Quarry	4	2	932	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.3.1004	2007	Lower Sanctuary Quarry	4	3	1004	*Hydnophora*	*cf. solidior*	1	Average - poor	z-like	Extant	Extinct	Platy
1	4.3.1008	2007	Lower Sanctuary Quarry	4	3	1008	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.3.1012	2007	Lower Sanctuary Quarry	4	3	1012	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.3.1014	2007	Lower Sanctuary Quarry	4	3	1014	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.3.1017	2007	Lower Sanctuary Quarry	4	3	1017	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.3.952	2007	Lower Sanctuary Quarry	4	3	952	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.3.966	2007	Lower Sanctuary Quarry	4	3	966	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.4.1043	2007	Lower Sanctuary Quarry	4	4	1043	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.5.1095	2007	Lower Sanctuary Quarry	4	5	1095	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	4.5.1101	2007	Lower Sanctuary Quarry	4	5	1101	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1106	2007	Lower Sanctuary Quarry	4	6	1106	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	4.6.1125	2007	Lower Sanctuary Quarry	4	6	1125	*Hydnophora*	*cf. solidior*	1	Average (lots of coralline algae & foram overgrow	z-like	Extant	Extinct	Platy
1	4.6.1135	2007	Lower Sanctuary Quarry	4	6	1135	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1161	2007	Lower Sanctuary Quarry	4	6	1161	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1162	2007	Lower Sanctuary Quarry	4	6	1162	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.6.1163	2007	Lower Sanctuary Quarry	4	6	1163	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1173	2007	Lower Sanctuary Quarry	4	6	1173	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.6.1176	2007	Lower Sanctuary Quarry	4	6	1176	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.6.1178	2007	Lower Sanctuary Quarry	4	6	1178	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1179	2007	Lower Sanctuary Quarry	4	6	1179	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1181	2007	Lower Sanctuary Quarry	4	6	1181	*Hydnophora*	*cf. solidior*	1	Average - poor	z-like	Extant	Extinct	Platy
1	4.6.1182	2007	Lower Sanctuary Quarry	4	6	1182	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1185	2007	Lower Sanctuary Quarry	4	6	1185	*Hydnophora*	*cf. solidior*	1	Average - poor	z-like	Extant	Extinct	Platy
1	4.6.1186	2007	Lower Sanctuary Quarry	4	6	1186	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1187	2007	Lower Sanctuary Quarry	4	6	1187	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1188	2007	Lower Sanctuary Quarry	4	6	1188	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1190	2007	Lower Sanctuary Quarry	4	6	1190	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.6.1191	2007	Lower Sanctuary Quarry	4	6	1191	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.7.1220	2007	Lower Sanctuary Quarry	4	7	1220	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.7.1221	2007	Lower Sanctuary Quarry	4	7	1221	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.7.1223	2007	Lower Sanctuary Quarry	4	7	1223	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.7.1227	2007	Lower Sanctuary Quarry	4	7	1227	*Hydnophora*	*cf. solidior*	1	Average (lots of coralline algae & foram overgrow	z-like	Extant	Extinct	Platy
1	4.7.1228	2007	Lower Sanctuary Quarry	4	7	1228	*Hydnophora*	*cf. solidior*	1	Average (lots of coralline algae & foram overgrow	z-like	Extant	Extinct	Platy
1	4.7.1229	2007	Lower Sanctuary Quarry	4	7	1229	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	4.8.1252	2007	Lower Sanctuary Quarry	4	8	1252	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	4.8.1266	2007	Lower Sanctuary Quarry	4	8	1266	*Hydnophora*	*cf. solidior*	1	Good... ?in grp	z-like	Extant	Extinct	Platy
1	4.8.1274	2007	Lower Sanctuary Quarry	4	8	1274	*Hydnophora*	*cf. solidior*	1	Good... ?in grp	z-like	Extant	Extinct	Platy
1	4.8.1288	2007	Lower Sanctuary Quarry	4	8	1288	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	5.-.1291	2007	Lake Quarry	5	8	1291	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	5.-.1292	2007	Lake Quarry	5	2	1292	*Hydnophora*	*cf. solidior*	1	Average - poor	z-like	Extant	Extinct	Platy
1	5.-.1293	2007	Lake Quarry	5	1	1293	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	5.-.1294	2007	Lake Quarry	5	1	1294	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	5.-.1295	2007	Lake Quarry	5	5	1295	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	5.-.1296	2007	Lake Quarry	5	1	1296	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	5.-.1297	2007	Lake Quarry	5	2	1297	*Hydnophora*	*cf. solidior*	1	Average...? In grp	z-like	Extant	Extinct	Platy
1	5.-.1298	2007	Lake Quarry	5	1	1298	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	5.-.1299	2007	Lake Quarry	5	4	1299	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	5.-.1300.	2007	Lake Quarry	5	4	1300	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	5.-.1386	2007	Lake Quarry	5	6	1386	*Hydnophora*	*cf. solidior*	1	Poor... ?in grp	z-like	Extant	Extinct	Platy
1	LQ: 2007	2007	Lake Quarry	LQ	0	2007	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	LSa: 2036	2007	Lower Sanctuary Quarry	LSa	0	2036	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	LSa1: 205	2006	Lower Sanctuary Quarry	LSa	0	205	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	LSa2: 230	2006	Lower Sanctuary Quarry	LSa	0	230	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	PO: 415	2007	Police Outcrop	PO	0	415	*Hydnophora*	*cf. solidior*	1	Good	z-like	Extant	Extinct	Platy
1	PO: 436	2007	Police Outcrop	PO	0	436	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	PO: 437	2007	Police Outcrop	PO	0	437	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	PO: 439	2007	Police Outcrop	PO	0	439	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	PP1: 219	2006	Police Outcrop	PO	0	219	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	PP1: 312	2006	Police Outcrop	PO	0	312	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	SaQ1: 49	2006	Sanctuary Quarry	SaQ	0	49	*Hydnophora*	*cf. solidior*	1	Average - poor	z-like	Extant	Extinct	Platy

1	SW1: 260	2006	Station West Quarry	SW	0	260	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	SW1: 262	2006	Station West Quarry	SW	0	262	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
1	SW1: 266	2006	Station West Quarry	SW	0	266	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	SW1: 268	2006	Station West Quarry	SW	0	268	*Hydnophora*	*cf. solidior*	1	Average	z-like	Extant	Extinct	Platy
1	SW1: 280	2006	Station West Quarry	SW	0	280	*Hydnophora*	*cf. solidior*	1	Poor	z-like	Extant	Extinct	Platy
86	1.4.89	2007	Sanctuary Quarry	1	4	89	*Indet.*	*sp.*	1		az-like	Extinct	Extinct	Solitary
10	LSa: 2028	2007	Lower Sanctuary Quarry	LSa	0	2028	*Indophyllia*	*cf. macassarensis*	1	Average	az-like	Extant	Extant	Solitary
17	SRQ3: 23	2006	Sukau Road Quarry	SRQ	0	23	*Leptastrea*	*cf. bottae/aequalis*	1	Average	z-like	Extant	Extant	Massive
18	3.5.790	2007	Mosque Quarry III	3	5	790	*Leptastrea*	*cf. transversa*	1	Average	z-like	Extant	Extant	Massive
28	2.-.607	2007	Rubbish Dump Quarry	2	0	607	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.416	2007	Rubbish Dump Quarry	2	1	416	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.439	2007	Rubbish Dump Quarry	2	1	439	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.441	2007	Rubbish Dump Quarry	2	1	441	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.445	2007	Rubbish Dump Quarry	2	1	445	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.447	2007	Rubbish Dump Quarry	2	1	447	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.1.456	2007	Rubbish Dump Quarry	2	1	456	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.2.469	2007	Rubbish Dump Quarry	2	2	469	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.2.476	2007	Rubbish Dump Quarry	2	2	476	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.2.484	2007	Rubbish Dump Quarry	2	2	484	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	2.2.489	2007	Rubbish Dump Quarry	2	2	489	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	3.2.697	2007	Mosque Quarry III	3	2	697	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.833	2007	Lower Sanctuary Quarry	4	1	833	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.835	2007	Lower Sanctuary Quarry	4	1	835	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.838	2007	Lower Sanctuary Quarry	4	1	838	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.842	2007	Lower Sanctuary Quarry	4	1	842	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.843	2007	Lower Sanctuary Quarry	4	1	843	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.846	2007	Lower Sanctuary Quarry	4	1	846	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.850	2007	Lower Sanctuary Quarry	4	1	850	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.1.851	2007	Lower Sanctuary Quarry	4	1	851	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.881	2007	Lower Sanctuary Quarry	4	2	881	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.882	2007	Lower Sanctuary Quarry	4	2	882	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.889	2007	Lower Sanctuary Quarry	4	2	889	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.890	2007	Lower Sanctuary Quarry	4	2	890	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.893	2007	Lower Sanctuary Quarry	4	2	893	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.905	2007	Lower Sanctuary Quarry	4	2	905	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.2.915	2007	Lower Sanctuary Quarry	4	2	915	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.1002	2007	Lower Sanctuary Quarry	4	3	1002	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.1003	2007	Lower Sanctuary Quarry	4	3	1003	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.936	2007	Lower Sanctuary Quarry	4	3	936	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.941	2007	Lower Sanctuary Quarry	4	3	941	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.945	2007	Lower Sanctuary Quarry	4	3	945	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.971	2007	Lower Sanctuary Quarry	4	3	971	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.972	2007	Lower Sanctuary Quarry	4	3	972	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.978	2007	Lower Sanctuary Quarry	4	3	978	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.986	2007	Lower Sanctuary Quarry	4	3	986	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.987	2007	Lower Sanctuary Quarry	4	3	987	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.991	2007	Lower Sanctuary Quarry	4	3	991	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.3.994	2007	Lower Sanctuary Quarry	4	3	994	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.5.1064	2007	Lower Sanctuary Quarry	4	5	1064	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.5.1065	2007	Lower Sanctuary Quarry	4	5	1065	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.5.1068	2007	Lower Sanctuary Quarry	4	5	1068	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.5.1077	2007	Lower Sanctuary Quarry	4	5	1077	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.5.1083	2007	Lower Sanctuary Quarry	4	5	1083	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1108	2007	Lower Sanctuary Quarry	4	6	1108	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1110	2007	Lower Sanctuary Quarry	4	6	1110	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1118	2007	Lower Sanctuary Quarry	4	6	1118	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1123	2007	Lower Sanctuary Quarry	4	6	1123	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1127	2007	Lower Sanctuary Quarry	4	6	1127	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1129	2007	Lower Sanctuary Quarry	4	6	1129	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1132	2007	Lower Sanctuary Quarry	4	6	1132	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1139	2007	Lower Sanctuary Quarry	4	6	1139	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1142	2007	Lower Sanctuary Quarry	4	6	1142	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1145	2007	Lower Sanctuary Quarry	4	6	1145	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1155	2007	Lower Sanctuary Quarry	4	6	1155	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.6.1168	2007	Lower Sanctuary Quarry	4	6	1168	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1232	2007	Lower Sanctuary Quarry	4	8	1232	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1244	2007	Lower Sanctuary Quarry	4	8	1244	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1245	2007	Lower Sanctuary Quarry	4	8	1245	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1246	2007	Lower Sanctuary Quarry	4	8	1246	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1249	2007	Lower Sanctuary Quarry	4	8	1249	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1259	2007	Lower Sanctuary Quarry	4	8	1259	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1261	2007	Lower Sanctuary Quarry	4	8	1261	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1265	2007	Lower Sanctuary Quarry	4	8	1265	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1278	2007	Lower Sanctuary Quarry	4	8	1278	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	4.8.1282	2007	Lower Sanctuary Quarry	4	8	1282	*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy

28	5.-.1417	2007	Lake Quarry	5	7	1417		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	5.-.1430.	2007	Lake Quarry	5	2	1430		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	5.-.1437	2007	Lake Quarry	5	8	1437		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	5.-.1438	2007	Lake Quarry	5	8	1438		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	LSa1: 197	2006	Lower Sanctuary Quarry	LSa	0	197		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	LSa2: 223	2006	Lower Sanctuary Quarry	LSa	0	223		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PO: 434	2007	Police Outcrop	PO	0	434		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PO: 435	2007	Police Outcrop	PO	0	435		*Leptoseris*	*aff. glabra/scabra*	1	Average	z-like	Extant	Extinct	Platy
28	PP1: 215	2006	Police Outcrop	PO	0	215		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PP1: 300	2006	Police Outcrop	PO	0	300		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PP1: 302	2006	Police Outcrop	PO	0	302		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PP1: 316	2006	Police Outcrop	PO	0	316		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PP1: 320	2006	Police Outcrop	PO	0	320		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	SW1: 400	2006	Station West Quarry	SW	0	400		*Leptoseris*	*aff. glabra/scabra*	42		z-like	Extant	Extinct	Platy
28	LSa 198	2006	Lower Sanctuary Quarry	LSa	0	198		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
28	PO: 315	2006	Police Outcrop	PO	0	315		*Leptoseris*	*aff. glabra/scabra*	1		z-like	Extant	Extinct	Platy
71	1.7.337 (b)	2007	Sanctuary Quarry	1	7	337	(b)	*Lophelia*	*sp. 1*	1	Good	az-like	Extant	Extinct	Branching
71	4.1.831 b	2007	Lower Sanctuary Quarry	4	1	831	b	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	4.2.917 c	2007	Lower Sanctuary Quarry	4	2	917	c	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	4.2.917 i	2007	Lower Sanctuary Quarry	4	2	917	i	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	4.3.1020	2007	Lower Sanctuary Quarry	4	3	1020		*Lophelia*	*sp. 1*	1	Good	az-like	Extant	Extinct	Branching
71	4.3.1022 a	2007	Lower Sanctuary Quarry	4	3	1022	a	*Lophelia*	*sp. 1*	1	Average-Poor (internal detail visible)	az-like	Extant	Extinct	Branching
71	4.3.1022 c	2007	Lower Sanctuary Quarry	4	3	1022	c	*Lophelia*	*sp. 1*	1	Good-Average (tiny well-preserved snail on one pi	az-like	Extant	Extinct	Branching
71	4.3.1022 c (i)	2007	Lower Sanctuary Quarry	4	3	1022	c (i)	*Lophelia*	*sp. 1*	1	Poor	az-like	Extant	Extinct	Branching
71	4.3.1022 c (ii)	2007	Lower Sanctuary Quarry	4	3	1022	c (ii)	*Lophelia*	*sp. 1*	1	Average-Poor	az-like	Extant	Extinct	Branching
71	4.3.1022 d	2007	Lower Sanctuary Quarry	4	3	1022	d	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	4.4.1031	2007	Lower Sanctuary Quarry	4	4	1031		*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	4.5.1102 a	2007	Lower Sanctuary Quarry	4	5	1102	a	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	4.5.1102 b	2007	Lower Sanctuary Quarry	4	5	1102	b	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	4.6.1192 b	2007	Lower Sanctuary Quarry	4	6	1192	b	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	5.-.1428	2007	Lake Quarry	5	4	1428		*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	5.-.1443	2007	Lake Quarry	5	2	1443		*Lophelia*	*sp. 1*	1	Good	az-like	Extant	Extinct	Branching
71	5.-.1444	2007	Lake Quarry	5	8	1444		*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	5.-.1445	2007	Lake Quarry	5	2	1445		*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	5.-.1446	2007	Lake Quarry	5	0	1446		*Lophelia*	*sp. 1*	1	Good (internal detail is great)	az-like	Extant	Extinct	Branching
71	5.-.1447	2007	Lake Quarry	5	4	1447		*Lophelia*	*sp. 1*	1	Poor	az-like	Extant	Extinct	Branching
71	5.-.1450	2007	Lake Quarry	5	7	1450		*Lophelia*	*sp. 1*	2	Good	az-like	Extant	Extinct	Branching
71	5.-.1452	2007	Lake Quarry	5	0	1452		*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	LSa: 2008	2007	Lower Sanctuary Quarry	LSa	0	2008		*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	LSa2: 225 d	2006	Lower Sanctuary Quarry	LSa	0	225	d	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	LSa2: 225 f	2006	Lower Sanctuary Quarry	LSa	0	225	f	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	LSa2: 240	2006	Lower Sanctuary Quarry	LSa	0	240		*Lophelia*	*sp. 1*	1	Good	az-like	Extant	Extinct	Branching
71	PP1: 401 c (i)	2006	Police Outcrop	PO	0	401	c (i)	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
71	PP1: 401 h	2006	Police Outcrop	PO	0	401	h	*Lophelia*	*sp. 1*	1	Average	az-like	Extant	Extinct	Branching
71	SW1: 274	2006	Station West Quarry	SW	0	274		*Lophelia*	*sp. 1*	1	Good	az-like	Extant	Extinct	Branching
71	SW1:281/ 400 h	2006	Station West Quarry	SW	0	281/400	h	*Lophelia*	*sp. 1*	1	Good-Average	az-like	Extant	Extinct	Branching
72	4.1.859 c (i)	2007	Lower Sanctuary Quarry	4	1	859	c (i)	*Lophelia*	*sp. 2*	1	Average	az-like	Extant	Extinct	Branching
72	4.2.917 f	2007	Lower Sanctuary Quarry	4	2	917	f	*Lophelia*	*sp. 2*	1	Poor	az-like	Extant	Extinct	Branching
72	4.3.1022 g	2007	Lower Sanctuary Quarry	4	3	1022	g	*Lophelia*	*sp. 2*	1	Good-Average	az-like	Extant	Extinct	Branching
72	4.8.1289	2007	Lower Sanctuary Quarry	4	8	1289		*Lophelia*	*sp. 2*	1	Average-Poor	az-like	Extant	Extinct	Branching
72	5.-.1431 (a)	2007	Lake Quarry	5	1	1431	a	*Lophelia*	*sp. 2*	1	Poor	az-like	Extant	Extinct	Branching
72	5.-.1453	2007	Lake Quarry	5	0	1453		*Lophelia*	*sp. 2*	1	Average	az-like	Extant	Extinct	Branching
72	LSa1: 402	2006	Lower Sanctuary Quarry	LSa	0	402		*Lophelia*	*sp. 2*	89	Average-Poor but with good internal details	az-like	Extant	Extinct	Branching
72	LSa2: 225 b	2006	Lower Sanctuary Quarry	LSa	0	225	b	*Lophelia*	*sp. 2*	1	Average	az-like	Extant	Extinct	Branching
72	LSa2: 225 e	2006	Lower Sanctuary Quarry	LSa	0	225	e	*Lophelia*	*sp. 2*	1	Average-Poor	az-like	Extant	Extinct	Branching
72	LSa2: 225 g	2006	Lower Sanctuary Quarry	LSa	0	225	g	*Lophelia*	*sp. 2*	1	Average	az-like	Extant	Extinct	Branching
72	LSa2: 225 k	2006	Lower Sanctuary Quarry	LSa	0	225	k	*Lophelia*	*sp. 2*	1	Good-Average	az-like	Extant	Extinct	Branching
72	PP1: 401 i	2006	Police Outcrop	PO	0	401	i	*Lophelia*	*sp. 2*	2	Good-Average	az-like	Extant	Extinct	Branching
72	PP2: 401 g	2006	Police Outcrop	PO	0	401	g	*Lophelia*	*sp. 2*	1	Good-Average	az-like	Extant	Extinct	Branching
39	2.1.451	2007	Rubbish Dump Quarry	2	1	451		*Merulina*	*aff. ampliata*	1	Poor	z-like	Extant	Extinct	Foliaceous
39	3.3.744	2007	Mosque Quarry III	3	3	744		*Merulina*	*aff. ampliata*	1	Poor	z-like	Extant	Extinct	Foliaceous
39	4.3.946	2007	Lower Sanctuary Quarry	4	3	946		*Merulina*	*aff. ampliata*	1	Average	z-like	Extant	Extinct	Foliaceous
37	1.7.316	2007	Sanctuary Quarry	1	7	316		*Montastraea*	*aff. curta*	1		z-like	Extant	Extinct	Massive
37	SRQ 1: 1	2006	Sukau Road Quarry	SRQ	0	1		*Montastraea*	*aff. curta*	1		z-like	Extant	Extinct	Massive
37	SRQ 20	2006	Sukau Road Quarry	SRQ	0	20		*Montastraea*	*aff. curta*	1		z-like	Extant	Extinct	Massive
34	1.4.73 a	2007	Sanctuary Quarry	1	4	73	a	*Montastraea*	*aff. tchihatcheffi*	1		z-like	Extant	Extinct	Massive
16	1.9.391	2007	Sanctuary Quarry	1	9	391		*Montastraea?*	*colemani*	1		z-like	Extant	Extant	Massive
16	SW1: 2023	2006	Station West Quarry	SW	0	2023		*Montastraea?*	*colemani*	1	Good	z-like	Extant	Extant	Massive
45	4.3.1019	2007	Lower Sanctuary Quarry	4	3	1019		*Montipora*	*?turgescens*	1	Poor	z-like	Extant	Extant	Platy
45	SaQ2: 92	2006	Sanctuary Quarry	SaQ	0	92		*Montipora*	*?turgescens*	1	Poor	z-like	Extant	Extant	Platy
46	1.9.376	2007	Sanctuary Quarry	1	9	376		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
46	1.9.384	2007	Sanctuary Quarry	1	9	384		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
46	2.1.393	2007	Rubbish Dump Quarry	2	1	393		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
46	4.3.1011	2007	Lower Sanctuary Quarry	4	3	1011		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
46	SaQ1: 117	2006	Sanctuary Quarry	SaQ	0	117		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy

46	SaQ1: 118	2006	Sanctuary Quarry	SaQ	0	118		*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
46	SaQ1: 81 a	2006	Sanctuary Quarry	SaQ	0	81	a	*Montipora*	*aff. hoffmeisteri*	5	Poor	z-like	Extant	Extinct	Platy
46	SaQ1: 81 c	2006	Sanctuary Quarry	SaQ	0	81	c	*Montipora*	*aff. hoffmeisteri*	1	Poor	z-like	Extant	Extinct	Platy
44	1.8.350	2007	Sanctuary Quarry	1	8	350		*Montipora*	*cf. nodosa*	1	Average-Poor	z-like	Extant	Extant	Platy
44	3.6.824	2007	Mosque Quarry III	3	6	824		*Montipora*	*cf. nodosa*	1	Poor	z-like	Extant	Extant	Platy
44	3.6.827	2007	Mosque Quarry III	3	6	827		*Montipora*	*cf. nodosa*	1	Poor	z-like	Extant	Extant	Platy
44	3.6.828	2007	Mosque Quarry III	3	6	828		*Montipora*	*cf. nodosa*	1	Poor	z-like	Extant	Extant	Platy
52	4.8.1238	2007	Lower Sanctuary Quarry	4	8	1238		*Mycedium?*	*elephantotus*	1	Average	z-like	Extant	Extant	Platy
52	5.-.1405	2007	Lake Quarry	5	6	1405		*Mycedium?*	*elephantotus*	1	Average	z-like	Extant	Extant	Platy
52	5.-.1408	2007	Lake Quarry	5	3	1408		*Mycedium?*	*elephantotus*	1	Average	z-like	Extant	Extant	Platy
52	5.-.1409	2007	Lake Quarry	5	8	1409		*Mycedium?*	*elephantotus*	1	Average	z-like	Extant	Extant	Platy
52	5.-.1432	2007	Lake Quarry	5	4	1432		*Mycedium?*	*elephantotus*	1	Average	z-like	Extant	Extant	Platy
3	1.2.21	2007	Sanctuary Quarry	1	2	21		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	1.2.22	2007	Sanctuary Quarry	1	2	22		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	1.2.24	2007	Sanctuary Quarry	1	2	24		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	1.3.45	2007	Sanctuary Quarry	1	3	45		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.3.50	2007	Sanctuary Quarry	1	3	50		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.3.60	2007	Sanctuary Quarry	1	3	60		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	1.5.134	2007	Sanctuary Quarry	1	5	134		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	1.5.139	2007	Sanctuary Quarry	1	5	139		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	1.6.74 a	2007	Sanctuary Quarry	1	6	74	a	*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	1.7.276	2007	Sanctuary Quarry	1	7	276		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.7.290	2007	Sanctuary Quarry	1	7	290		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	1.7.295	2007	Sanctuary Quarry	1	7	295		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.7.299	2007	Sanctuary Quarry	1	7	299		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	1.7.304	2007	Sanctuary Quarry	1	7	304		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	1.7.327	2007	Sanctuary Quarry	1	7	327		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.7.329	2007	Sanctuary Quarry	1	7	329		*Oulophyllia*	*sp. 1*	1	Good (internal)	z-like	Extant	Extinct	Platy
3	1.8.354	2007	Sanctuary Quarry	1	8	354		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	1.8.365	2007	Sanctuary Quarry	1	8	365		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	1.9.387	2007	Sanctuary Quarry	1	9	387		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	2.1.396	2007	Rubbish Dump Quarry	2	1	396		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	2.1.413	2007	Rubbish Dump Quarry	2	1	413		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.3.496	2007	Rubbish Dump Quarry	2	3	496		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	2.3.504	2007	Rubbish Dump Quarry	2	3	504		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.3.505	2007	Rubbish Dump Quarry	2	3	505		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	2.4.526	2007	Rubbish Dump Quarry	2	4	526		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.4.534	2007	Rubbish Dump Quarry	2	4	534		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.4.544	2007	Rubbish Dump Quarry	2	4	544		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.5.550	2007	Rubbish Dump Quarry	2	5	550		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.5.560	2007	Rubbish Dump Quarry	2	5	560		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	2.6.562	2007	Rubbish Dump Quarry	2	6	562		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	2.6.566	2007	Rubbish Dump Quarry	2	6	566		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	2.6.578	2007	Rubbish Dump Quarry	2	6	578		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.7.601	2007	Rubbish Dump Quarry	2	7	601		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	2.7.604	2007	Rubbish Dump Quarry	2	7	604		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	3.1.636	2007	Mosque Quarry III	3	1	636		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.1 866	2007	Lower Sanctuary Quarry	4	1	866		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.1.834	2007	Lower Sanctuary Quarry	4	1	834		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.1.847	2007	Lower Sanctuary Quarry	4	1	847		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	4.1.868	2007	Lower Sanctuary Quarry	4	1	868		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	4.1.870	2007	Lower Sanctuary Quarry	4	1	870		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.1.876	2007	Lower Sanctuary Quarry	4	1	876		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.1.877	2007	Lower Sanctuary Quarry	4	1	877		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.1.879	2007	Lower Sanctuary Quarry	4	1	879		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.1.880	2007	Lower Sanctuary Quarry	4	1	880		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	4.2.891	2007	Lower Sanctuary Quarry	4	2	891		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.2.914	2007	Lower Sanctuary Quarry	4	2	914		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.2.922	2007	Lower Sanctuary Quarry	4	2	922		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.3.1001	2007	Lower Sanctuary Quarry	4	3	1001		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.3.1007	2007	Lower Sanctuary Quarry	4	3	1007		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.3.1009	2007	Lower Sanctuary Quarry	4	3	1009		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	4.3.1015	2007	Lower Sanctuary Quarry	4	3	1015		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.3.980	2007	Lower Sanctuary Quarry	4	3	980		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.3.995	2007	Lower Sanctuary Quarry	4	3	995		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.4.1042	2007	Lower Sanctuary Quarry	4	4	1042		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.4.1047	2007	Lower Sanctuary Quarry	4	4	1047		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.4.1048	2007	Lower Sanctuary Quarry	4	4	1048		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	4.5.1084	2007	Lower Sanctuary Quarry	4	5	1084		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.5.1099	2007	Lower Sanctuary Quarry	4	5	1099		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1131	2007	Lower Sanctuary Quarry	4	6	1131		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.6.1133	2007	Lower Sanctuary Quarry	4	6	1133		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1138	2007	Lower Sanctuary Quarry	4	6	1138		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1140	2007	Lower Sanctuary Quarry	4	6	1140		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1146	2007	Lower Sanctuary Quarry	4	6	1146		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy

3	4.6.1159	2007	Lower Sanctuary Quarry	4	6	1159		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.6.1174	2007	Lower Sanctuary Quarry	4	6	1174		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1177	2007	Lower Sanctuary Quarry	4	6	1177		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.6.1180	2007	Lower Sanctuary Quarry	4	6	1180		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	4.6.1184	2007	Lower Sanctuary Quarry	4	6	1184		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.6.1189	2007	Lower Sanctuary Quarry	4	6	1189		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	4.7.1211	2007	Lower Sanctuary Quarry	4	7	1211		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.7.1224	2007	Lower Sanctuary Quarry	4	7	1224		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	4.7.1225	2007	Lower Sanctuary Quarry	4	7	1225		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	4.7.1226	2007	Lower Sanctuary Quarry	4	7	1226		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	4.8.1277	2007	Lower Sanctuary Quarry	4	8	1277		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	5.-.1322	2007	Lake Quarry	5	6	1322		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	5.-.1340	2007	Lake Quarry	5	7	1340		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	5.-.1341	2007	Lake Quarry	5	1	1341		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	5.-.1342	2007	Lake Quarry	5	1	1342		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	5.-.1357	2007	Lake Quarry	5	1	1357		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	5.-.1358	2007	Lake Quarry	5	5	1358		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	5.-.1359	2007	Lake Quarry	5	1	1359		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	5.-.1360.	2007	Lake Quarry	5	5	1360		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	5.-.1361	2007	Lake Quarry	5	1	1361		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	5.-.1362	2007	Lake Quarry	5	3	1362		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	5.-.1363	2007	Lake Quarry	5	8	1363		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	5.-.1388	2007	Lake Quarry	5	6	1388		*Oulophyllia*	*sp. 1*	1	Average (cut open lump)	z-like	Extant	Extinct	Platy
3	5.-.1389	2007	Lake Quarry	5	7	1389		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	5.-.1403	2007	Lake Quarry	5	1	1403		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	5.-.1404	2007	Lake Quarry	5	7	1404		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	5.-.1434	2007	Lake Quarry	5	8	1434		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	LSa: 2001	2007	Lower Sanctuary Quarry	LSa	0	2001		*Oulophyllia*	*sp. 1*	1	Average - poss. Internal detail	z-like	Extant	Extinct	Platy
3	LSa: 2005	2007	Lower Sanctuary Quarry	LSa	0	2005		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	LSa1: 200	2006	Lower Sanctuary Quarry	LSa	0	200		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	LSa2: 226	2006	Lower Sanctuary Quarry	LSa	0	226		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	LSa2: 231	2006	Lower Sanctuary Quarry	LSa	0	231		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	MQ2 168	2006	Mosque Quarry II	MQ2	0	168		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	PO: 2004	2007	Police Outcrop	PO	0	2004		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PO: 2030	2007	Police Outcrop	PO	0	2030		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PO: 411	2007	Police Outcrop	PO	0	411		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PO: 412	2007	Police Outcrop	PO	0	412		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	PO: 413	2007	Police Outcrop	PO	0	413		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	PO: 414	2007	Police Outcrop	PO	0	414		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	PO: 419	2007	Police Outcrop	PO	0	419		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	PO: 423	2007	Police Outcrop	PO	0	423		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PO: 424	2007	Police Outcrop	PO	0	424		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PO: 427	2007	Police Outcrop	PO	0	427		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	PO: 430	2007	Police Outcrop	PO	0	430		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	PP1: 301	2006	Police Outcrop	PO	0	301		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	PP1: 304	2006	Police Outcrop	PO	0	304		*Oulophyllia*	*sp. 1*	1	Poor	z-like	Extant	Extinct	Platy
3	PP1: 310	2006	Police Outcrop	PO	0	310		*Oulophyllia*	*sp. 1*	1	Average-Poor	z-like	Extant	Extinct	Platy
3	PP1: 329	2006	Police Outcrop	PO	0	329		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
3	SaQ 160	2006	Sanctuary Quarry	SaQ	0	160		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	SW 252	2006	Station West	SW	0	252		*Oulophyllia*	*sp. 1*	1		z-like	Extant	Extinct	Platy
3	SW1: 261	2006	Station West Quarry	SW	0	261		*Oulophyllia*	*sp. 1*	1	Good-Average	z-like	Extant	Extinct	Platy
3	1.6.183	2007	Sanctuary Quarry	1	6	183		*Oulophyllia*	*sp. 1*	1	Good	z-like	Extant	Extinct	Platy
3	2.2.467	2007	Rubbish Dump Quarry	2	2	467		*Oulophyllia*	*sp. 1*	1	Average	z-like	Extant	Extinct	Platy
5	1.5.129	2007	Sanctuary Quarry	1	5	129		*Pachyseris*	*aff. foliosa/involuta*	1	Average-Poor	z-like	Extant	Extinct	Platy
5	1.5.160	2007	Sanctuary Quarry	1	5	160		*Pachyseris*	*aff. foliosa/involuta*	1	Average-Poor	z-like	Extant	Extinct	Platy
5	1.7.233	2007	Sanctuary Quarry	1	7	233		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	1.7.254 a	2007	Sanctuary Quarry	1	7	254	a	*Pachyseris*	*aff. foliosa/involuta*	16		z-like	Extant	Extinct	Platy
5	2.1.419	2007	Rubbish Dump Quarry	2	1	419		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	2.1.422 (b)	2007	Rubbish Dump Quarry	2	1	422	b	*Pachyseris*	*aff. foliosa/involuta*	1	Average-Poor	z-like	Extant	Extinct	Platy
5	2.1.435	2007	Rubbish Dump Quarry	2	1	435		*Pachyseris*	*aff. foliosa/involuta*	1	Good-Average	z-like	Extant	Extinct	Platy
5	2.1.443	2007	Rubbish Dump Quarry	2	1	443		*Pachyseris*	*aff. foliosa/involuta*	1	Average (is halfway between 5 and 5a)	z-like	Extant	Extinct	Platy
5	2.3.497	2007	Rubbish Dump Quarry	2	3	497		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	2.4.531	2007	Rubbish Dump Quarry	2	4	531		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	2.6.571	2007	Rubbish Dump Quarry	2	6	571		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	3.3.735	2007	Mosque Quarry III	3	3	735		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	3.5.795	2007	Mosque Quarry III	3	5	795		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	4.1.871	2007	Lower Sanctuary Quarry	4	1	871		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	4.2.1152	2007	Lower Sanctuary Quarry	4	2	1152		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	4.2.886	2007	Lower Sanctuary Quarry	4	2	886		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.3.942	2007	Lower Sanctuary Quarry	4	3	942		*Pachyseris*	*aff. foliosa/involuta*	1	Good-Average	z-like	Extant	Extinct	Platy
5	4.3.973	2007	Lower Sanctuary Quarry	4	3	973		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	4.5.1078	2007	Lower Sanctuary Quarry	4	5	1078		*Pachyseris*	*aff. foliosa/involuta*	1	Good-Average	z-like	Extant	Extinct	Platy
5	4.5.1080	2007	Lower Sanctuary Quarry	4	5	1080		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	4.5.1088	2007	Lower Sanctuary Quarry	4	5	1088		*Pachyseris*	*aff. foliosa/involuta*	1	Good-Average	z-like	Extant	Extinct	Platy
5	4.5.1097	2007	Lower Sanctuary Quarry	4	5	1097		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy

5	4.6.1113	2007	Lower Sanctuary Quarry	4	6	1113		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.6.1116	2007	Lower Sanctuary Quarry	4	6	1116		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	4.6.1134	2007	Lower Sanctuary Quarry	4	6	1134		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.7.1195	2007	Lower Sanctuary Quarry	4	7	1195		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.7.1200	2007	Lower Sanctuary Quarry	4	7	1200		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.7.1203	2007	Lower Sanctuary Quarry	4	7	1203		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	4.7.1208	2007	Lower Sanctuary Quarry	4	7	1208		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	4.7.1215	2007	Lower Sanctuary Quarry	4	7	1215		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	4.8.1283	2007	Lower Sanctuary Quarry	4	8	1283		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1375	2007	Lake Quarry	5	8	1375		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1376	2007	Lake Quarry	5	1	1376		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1377	2007	Lake Quarry	5	4	1377		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1378	2007	Lake Quarry	5	1	1378		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1379	2007	Lake Quarry	5	1	1379		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	5.-.1381	2007	Lake Quarry	5	6	1381		*Pachyseris*	*aff. foliosa/involuta*	1	Good	z-like	Extant	Extinct	Platy
5	5.-.1382	2007	Lake Quarry	5	1	1382		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	5.-.1383	2007	Lake Quarry	5	2	1383		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	5.-.1384	2007	Lake Quarry	5	1	1384		*Pachyseris*	*aff. foliosa/involuta*	1	Average	z-like	Extant	Extinct	Platy
5	5.-.1385	2007	Lake Quarry	5	7	1385		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	LSa1: 202	2006	Lower Sanctuary Quarry	LSa	0	202		*Pachyseris*	*aff. foliosa/involuta*	1	Good (is very Leptoseris-like)	z-like	Extant	Extinct	Platy
5	NQ1: 194	2006	Neil's Quarry	NQ	0	194		*Pachyseris*	*aff. foliosa/involuta*	1	Poor	z-like	Extant	Extinct	Platy
5	SW1 :253	2006	Station West Quarry	SW	0	253		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	SW1: 238	2006	Station West Quarry	SW	0	238		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	SW1: 249	2006	Station West Quarry	SW	0	249		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	SW1: 254	2006	Station West Quarry	SW	0	254		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	SW1: 255	2006	Station West Quarry	SW	0	255		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
5	SW1: 256	2006	Station West Quarry	SW	0	256		*Pachyseris*	*aff. foliosa/involuta*	1		z-like	Extant	Extinct	Platy
6	1.2.34 a	2007	Sanctuary Quarry	1	2	34	a	*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.2.34 b	2007	Sanctuary Quarry	1	2	34	b	*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.4.99	2007	Sanctuary Quarry	1	4	99		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.247	2007	Sanctuary Quarry	1	7	247		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.302	2007	Sanctuary Quarry	1	7	302		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.334	2007	Sanctuary Quarry	1	7	334		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.336 a	2007	Sanctuary Quarry	1	7	336	a	*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.336 b	2007	Sanctuary Quarry	1	7	336	b	*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	1.7.336 c	2007	Sanctuary Quarry	1	7	336	c	*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.1.404	2007	Rubbish Dump Quarry	2	1	404		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.1.425	2007	Rubbish Dump Quarry	2	1	425		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.1.430	2007	Rubbish Dump Quarry	2	1	430		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.3.493	2007	Rubbish Dump Quarry	2	3	493		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.521	2007	Rubbish Dump Quarry	2	4	521		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.523	2007	Rubbish Dump Quarry	2	4	523		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.525	2007	Rubbish Dump Quarry	2	4	525		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.527	2007	Rubbish Dump Quarry	2	4	527		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.528	2007	Rubbish Dump Quarry	2	4	528		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.532	2007	Rubbish Dump Quarry	2	4	532		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.538	2007	Rubbish Dump Quarry	2	4	538		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.4.543	2007	Rubbish Dump Quarry	2	4	543		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.6.565	2007	Rubbish Dump Quarry	2	6	565		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.584	2007	Rubbish Dump Quarry	2	7	584		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.590	2007	Rubbish Dump Quarry	2	7	590		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.592	2007	Rubbish Dump Quarry	2	7	592		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.594	2007	Rubbish Dump Quarry	2	7	594		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.598	2007	Rubbish Dump Quarry	2	7	598		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.599	2007	Rubbish Dump Quarry	2	7	599		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	2.7.603	2007	Rubbish Dump Quarry	2	7	603		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.1.839	2007	Lower Sanctuary Quarry	4	1	839		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.1.854	2007	Lower Sanctuary Quarry	4	1	854		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.2.899	2007	Lower Sanctuary Quarry	4	2	899		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.2.916	2007	Lower Sanctuary Quarry	4	2	916		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.2.924	2007	Lower Sanctuary Quarry	4	2	924		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.2.929	2007	Lower Sanctuary Quarry	4	2	929		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.3.959	2007	Lower Sanctuary Quarry	4	3	959		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.3.981	2007	Lower Sanctuary Quarry	4	3	981		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.3.990	2007	Lower Sanctuary Quarry	4	3	990		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.3.998	2007	Lower Sanctuary Quarry	4	3	998		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.5.1056	2007	Lower Sanctuary Quarry	4	5	1056		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.5.1070	2007	Lower Sanctuary Quarry	4	5	1070		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.5.1075	2007	Lower Sanctuary Quarry	4	5	1075		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.6.1136	2007	Lower Sanctuary Quarry	4	6	1136		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.6.1149	2007	Lower Sanctuary Quarry	4	6	1149		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.6.1153	2007	Lower Sanctuary Quarry	4	6	1153		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.6.1157	2007	Lower Sanctuary Quarry	4	6	1157		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.6.1160	2007	Lower Sanctuary Quarry	4	6	1160		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.7.1206	2007	Lower Sanctuary Quarry	4	7	1206		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy

6	4.8.1233	2007	Lower Sanctuary Quarry	4	8	1233		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.8.1239	2007	Lower Sanctuary Quarry	4	8	1239		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.8.1243	2007	Lower Sanctuary Quarry	4	8	1243		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.8.1253	2007	Lower Sanctuary Quarry	4	8	1253		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.8.1268	2007	Lower Sanctuary Quarry	4	8	1268		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1314	2007	Lake Quarry	5	3	1314		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1315	2007	Lake Quarry	5	7	1315		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1316	2007	Lake Quarry	5	5	1316		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1317	2007	Lake Quarry	5	7	1317		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1318	2007	Lake Quarry	5	1	1318		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1319	2007	Lake Quarry	5	1	1319		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1320	2007	Lake Quarry	5	6	1320		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1321	2007	Lake Quarry	5	7	1321		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1323	2007	Lake Quarry	5	2	1323		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1324	2007	Lake Quarry	5	7	1324		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1326	2007	Lake Quarry	5	7	1326		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1327	2007	Lake Quarry	5	7	1327		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1328	2007	Lake Quarry	5	3	1328		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1329	2007	Lake Quarry	5	4	1329		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1330	2007	Lake Quarry	5	1	1330		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1331	2007	Lake Quarry	5	2	1331		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1332	2007	Lake Quarry	5	3	1332		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1333	2007	Lake Quarry	5	8	1333		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1334	2007	Lake Quarry	5	1	1334		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1335	2007	Lake Quarry	5	1	1335		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1336	2007	Lake Quarry	5	4	1336		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1337	2007	Lake Quarry	5	6	1337		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1338	2007	Lake Quarry	5	4	1338		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1339	2007	Lake Quarry	5	8	1339		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1411	2007	Lake Quarry	5	2	1411		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	5.-.1418	2007	Lake Quarry	5	2	1418		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LQ: 2009	2007	Lake Quarry	LQ	0	2009		*Pachyseris*	*speciosa*	1	Poor (Pachyseris gemmacea?)	z-like	Extant	Extant	Platy
6	LSa 245	2006	Lower Sanctuary Quarry	LSa	0	245		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa: 2006	2007	Lower Sanctuary Quarry	LSa	0	2006		*Pachyseris*	*speciosa*	1	Good	z-like	Extant	Extant	Platy
6	LSa: 2010	2007	Lower Sanctuary Quarry	LSa	0	2010		*Pachyseris*	*speciosa*	1	Good	z-like	Extant	Extant	Platy
6	LSa1: 203	2006	Lower Sanctuary Quarry	LSa	0	203		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa1: 212	2006	Lower Sanctuary Quarry	LSa	0	212		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 227	2006	Lower Sanctuary Quarry	LSa	0	227		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 228	2006	Lower Sanctuary Quarry	LSa	0	228		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 229	2006	Lower Sanctuary Quarry	LSa	0	229		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 239	2006	Lower Sanctuary Quarry	LSa	0	239		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 244	2006	Lower Sanctuary Quarry	LSa	0	244		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	LSa2: 246	2006	Lower Sanctuary Quarry	LSa	0	246		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PP1: 214	2006	Police Outcrop	PO	0	214		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PP1: 311	2006	Police Outcrop	PO	0	311		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PP1: 318	2006	Police Outcrop	PO	0	318		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PP1: 327	2006	Police Outcrop	PO	0	327		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PP1:303	2006	Police Outcrop	PO	0	303		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	4.8.1258	2007	Lower Sanctuary Quarry	4	8	1258		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
6	PO 321	2006	Police Outcrop	PO	0	321		*Pachyseris*	*speciosa*	1		z-like	Extant	Extant	Platy
60	1.5.155	2007	Sanctuary Quarry	1	5	155		*Palauastrea*	*cf. ramosa*	1	Average	z-like	Extant	Extant	Branching
60	1.5.159	2007	Sanctuary Quarry	1	5	159		*Palauastrea*	*cf. ramosa*	1	Average	z-like	Extant	Extant	Branching
89	4.1.831 a	2007	Lower Sanctuary Quarry	4	1	831	a	*PECTINIID*	*sp.*	1		az-like	Extinct	Extinct	Solitary
23	1.5.143	2007	Sanctuary Quarry	1	5	143		*Platygyra*	*cf. daedaela*	1	Good-Average	z-like	Extant	Extant	Platy
11	1.3.61	2007	Sanctuary Quarry	1	3	61		*Platygyra*	*cf. lamellina*	1	Good-Average	z-like	Extant	Extant	Platy
11	1.7.308	2007	Sanctuary Quarry	1	7	308		*Platygyra*	*cf. lamellina*	1	Average	z-like	Extant	Extant	Platy
25	1.7.231	2007	Sanctuary Quarry	1	7	231		*Platygyra*	*naroetensis*	1	Average-Poor	z-like	Extant	Extinct	Massive
38	3.3.749	2007	Mosque Quarry III	3	3	749		*Plesiastrea*	*aff. versipora*	1		z-like	Extant	Extinct	Platy
38	MQ2 1: 164	2006	Mosque Quarry II	MQ2	0	164		*Plesiastrea*	*aff. versipora*	1		z-like	Extant	Extinct	Platy
76	2.4.536	2007	Rubbish Dump Quarry	2	4	536		*Podobacia*	*crustacea*	1	Good	z-like	Extant	Extant	Platy
76	4.3.953	2007	Lower Sanctuary Quarry	4	3	953		*Podobacia*	*crustacea*	1	Good	z-like	Extant	Extant	Platy
73	1.3.40	2007	Sanctuary Quarry	1	3	40		*Porites*	*sp. 1 (platy form)*	1	Good-Average	z-like	Extant	Extinct	Platy
73	1.4.101	2007	Sanctuary Quarry	1	4	101		*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	2.1.398	2007	Rubbish Dump Quarry	2	1	398		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.1.400	2007	Rubbish Dump Quarry	2	1	400		*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	2.1.415	2007	Rubbish Dump Quarry	2	1	415		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.1.428	2007	Rubbish Dump Quarry	2	1	428		*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	2.1.440	2007	Rubbish Dump Quarry	2	1	440		*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	2.2.485	2007	Rubbish Dump Quarry	2	2	485		*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	2.3.507	2007	Rubbish Dump Quarry	2	3	507		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.4.522	2007	Rubbish Dump Quarry	2	4	522		*Porites*	*sp. 1 (platy form)*	1	Good-Average	z-like	Extant	Extinct	Platy
73	2.4.536	2007	Rubbish Dump Quarry	2	4	536		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.4.541	2007	Rubbish Dump Quarry	2	4	541		*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	2.5.549	2007	Rubbish Dump Quarry	2	5	549		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.5.551	2007	Rubbish Dump Quarry	2	5	551		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy

73	2.6.561	2007	Rubbish Dump Quarry	2	6	561	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	2.6.579	2007	Rubbish Dump Quarry	2	6	579	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	2.6.580	2007	Rubbish Dump Quarry	2	6	580	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.7.582	2007	Rubbish Dump Quarry	2	7	582	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.7.586	2007	Rubbish Dump Quarry	2	7	586	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	2.7.597	2007	Rubbish Dump Quarry	2	7	597	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	2.7.600	2007	Rubbish Dump Quarry	2	7	600	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.1.617	2007	Mosque Quarry III	3	1	617	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.1.652	2007	Mosque Quarry III	3	1	652	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.1.659	2007	Mosque Quarry III	3	1	659	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.1.672	2007	Mosque Quarry III	3	1	672	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.2.685	2007	Mosque Quarry III	3	2	685	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.2.694	2007	Mosque Quarry III	3	2	694	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.2.696	2007	Mosque Quarry III	3	2	696	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.2.714	2007	Mosque Quarry III	3	2	714	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	3.2.719	2007	Mosque Quarry III	3	2	719	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.3.747	2007	Mosque Quarry III	3	3	747	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.3.758	2007	Mosque Quarry III	3	3	758	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.4.768	2007	Mosque Quarry III	3	4	768	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.4.774	2007	Mosque Quarry III	3	4	774	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.4.777	2007	Mosque Quarry III	3	4	777	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.5.791	2007	Mosque Quarry III	3	5	791	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	3.5.792	2007	Mosque Quarry III	3	5	792	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.6.806	2007	Mosque Quarry III	3	6	806	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	3.6.807	2007	Mosque Quarry III	3	6	807	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	3.6.821	2007	Mosque Quarry III	3	6	821	*Porites*	*sp. 1 (platy form)*	1	Good-Average	z-like	Extant	Extinct	Platy
73	4.1.853	2007	Lower Sanctuary Quarry	4	1	853	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.1.855	2007	Lower Sanctuary Quarry	4	1	855	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	4.2.888	2007	Lower Sanctuary Quarry	4	2	888	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.2.907	2007	Lower Sanctuary Quarry	4	2	907	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.2.909	2007	Lower Sanctuary Quarry	4	2	909	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	4.3.943	2007	Lower Sanctuary Quarry	4	3	943	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.3.969	2007	Lower Sanctuary Quarry	4	3	969	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.3.974	2007	Lower Sanctuary Quarry	4	3	974	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.3.976	2007	Lower Sanctuary Quarry	4	3	976	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.3.989	2007	Lower Sanctuary Quarry	4	3	989	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.3.996	2007	Lower Sanctuary Quarry	4	3	996	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.4.1025	2007	Lower Sanctuary Quarry	4	4	1025	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.4.1026	2007	Lower Sanctuary Quarry	4	4	1026	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.4.1036	2007	Lower Sanctuary Quarry	4	4	1036	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.4.1037	2007	Lower Sanctuary Quarry	4	4	1037	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.4.1044	2007	Lower Sanctuary Quarry	4	4	1044	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.4.1046	2007	Lower Sanctuary Quarry	4	4	1046	*Porites*	*sp. 1 (platy form)*	1	Good-Average	z-like	Extant	Extinct	Platy
73	4.5.1059	2007	Lower Sanctuary Quarry	4	5	1059	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.5.1086	2007	Lower Sanctuary Quarry	4	5	1086	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	4.5.1089	2007	Lower Sanctuary Quarry	4	5	1089	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.5.1091	2007	Lower Sanctuary Quarry	4	5	1091	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.5.1096	2007	Lower Sanctuary Quarry	4	5	1096	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	4.5.1098	2007	Lower Sanctuary Quarry	4	5	1098	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.5.1100	2007	Lower Sanctuary Quarry	4	5	1100	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.6.1167	2007	Lower Sanctuary Quarry	4	6	1167	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	4.6.577	2007	Lower Sanctuary Quarry	4	6	577	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.7.1213	2007	Lower Sanctuary Quarry	4	7	1213	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	4.7.1222	2007	Lower Sanctuary Quarry	4	7	1222	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.8.1263	2007	Lower Sanctuary Quarry	4	8	1263	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.8.1272	2007	Lower Sanctuary Quarry	4	8	1272	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	4.8.1280	2007	Lower Sanctuary Quarry	4	8	1280	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	4.8.1286	2007	Lower Sanctuary Quarry	4	8	1286	*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	5.-.1305	2007	Lake Quarry	5	5	1305	*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	5.-.1306	2007	Lake Quarry	5	4	1306	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1307	2007	Lake Quarry	5	3	1307	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1308	2007	Lake Quarry	5	2	1308	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1309	2007	Lake Quarry	5	2	1309	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1310	2007	Lake Quarry	5	7	1310	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1311	2007	Lake Quarry	5	1	1311	*Porites*	*sp. 1 (platy form)*	1	Good-Average	z-like	Extant	Extinct	Platy
73	5.-.1312	2007	Lake Quarry	5	2	1312	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1313	2007	Lake Quarry	5	2	1313	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1387	2006	Lake Quarry	5	1	1387	*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	5.-.1393	2007	Lake Quarry	5	6	1393	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1394	2007	Lake Quarry	5	1	1394	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1395	2007	Lake Quarry	5	4	1395	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1396	2007	Lake Quarry	5	1	1396	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1397	2007	Lake Quarry	5	1	1397	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1398	2007	Lake Quarry	5	7	1398	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	5.-.1460.	2007	Lake Quarry	5	1	1460	*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy

73	PO 305	2006	Police Outcrop	PO	0	305		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	PO 422	2006	Police Outcrop	PO	0	422		*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	PO 433	2006	Police Outcrop	PO	0	433		*Porites*	*sp. 1 (platy form)*	1		z-like	Extant	Extinct	Platy
73	PO: 420	2007	Police Outcrop	PO	0	420		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	PO: 421	2007	Police Outcrop	PO	0	421		*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	PO: 426	2007	Police Outcrop	PO	0	426		*Porites*	*sp. 1 (platy form)*	1	Average	z-like	Extant	Extinct	Platy
73	PP1: 218	2006	Police Outcrop	PO	0	218		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	PP1: 309	2006	Police Outcrop	PO	0	309		*Porites*	*sp. 1 (platy form)*	1	Poor	z-like	Extant	Extinct	Platy
73	PP1: 328	2006	Police Outcrop	PO	0	328		*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	SW1: 247	2006	Station West Quarry	SW	0	247		*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
73	SW1: 248	2006	Station West Quarry	SW	0	248		*Porites*	*sp. 1 (platy form)*	1	Average-Poor	z-like	Extant	Extinct	Platy
74	1.1.10	2007	Sanctuary Quarry	1	1	10		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	1.3.54	2007	Sanctuary Quarry	1	3	54		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	1.3.71	2007	Sanctuary Quarry	1	3	71		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.4.106	2007	Sanctuary Quarry	1	4	106		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.4.107	2007	Sanctuary Quarry	1	4	107		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.4.85	2007	Sanctuary Quarry	1	4	85		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.4.87	2007	Sanctuary Quarry	1	4	87		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.4.98	2007	Sanctuary Quarry	1	4	98		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.5.164	2007	Sanctuary Quarry	1	5	164		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.169	2007	Sanctuary Quarry	1	6	169		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.6.176	2007	Sanctuary Quarry	1	6	176		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.177	2007	Sanctuary Quarry	1	6	177		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.184	2007	Sanctuary Quarry	1	6	184		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.6.188	2007	Sanctuary Quarry	1	6	188		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	1.6.189	2007	Sanctuary Quarry	1	6	189		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.196	2007	Sanctuary Quarry	1	6	196		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.199	2007	Sanctuary Quarry	1	6	199		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.207	2007	Sanctuary Quarry	1	6	207		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.6.210	2007	Sanctuary Quarry	1	6	210		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	1.6.211	2007	Sanctuary Quarry	1	6	211		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.6.212	2007	Sanctuary Quarry	1	6	212		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.213	2007	Sanctuary Quarry	1	6	213		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.6.215	2007	Sanctuary Quarry	1	6	215		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.216	2007	Sanctuary Quarry	1	6	216		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	1.6.217	2007	Sanctuary Quarry	1	6	217		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.218	2007	Sanctuary Quarry	1	6	218		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.219	2007	Sanctuary Quarry	1	6	219		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.6.222	2007	Sanctuary Quarry	1	6	222		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.226	2007	Sanctuary Quarry	1	7	226		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.237	2007	Sanctuary Quarry	1	7	237		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.238	2007	Sanctuary Quarry	1	7	238		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.241	2007	Sanctuary Quarry	1	7	241		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.246	2007	Sanctuary Quarry	1	7	246		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.248	2007	Sanctuary Quarry	1	7	248		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.253	2007	Sanctuary Quarry	1	7	253		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.253 c	2007	Sanctuary Quarry	1	7	253	c	*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.259	2007	Sanctuary Quarry	1	7	259		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.287	2007	Sanctuary Quarry	1	7	287		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.293	2007	Sanctuary Quarry	1	7	293		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.305	2007	Sanctuary Quarry	1	7	305		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	1.7.311	2007	Sanctuary Quarry	1	7	311		*Porites*	*sp. 2 (branching form)*	1	Poor (but looks like a finger!! lol)	z-like	Extant	Extinct	Branching
74	1.7.312	2007	Sanctuary Quarry	1	7	312		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	1.7.314	2007	Sanctuary Quarry	1	7	314		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.7.315	2007	Sanctuary Quarry	1	7	315		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.7.331	2007	Sanctuary Quarry	1	7	331		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	1.8.344	2007	Sanctuary Quarry	1	8	344		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	1.8.345	2007	Sanctuary Quarry	1	8	345		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	1.8.348	2007	Sanctuary Quarry	1	8	348		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.8.358	2007	Sanctuary Quarry	1	8	358		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.8.364	2007	Sanctuary Quarry	1	8	364		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.9.385	2007	Sanctuary Quarry	1	9	385		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.9.386	2007	Sanctuary Quarry	1	9	386		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	1.9.392	2007	Sanctuary Quarry	1	9	392		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	1.9.395	2007	Sanctuary Quarry	1	9	395		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 106	2006	Sanctuary Quarry	SaQ	0	106		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 107	2006	Sanctuary Quarry	SaQ	0	107		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 111	2006	Sanctuary Quarry	SaQ	0	111		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	SaQ1: 120	2006	Sanctuary Quarry	SaQ	0	120		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	SaQ1: 121	2006	Sanctuary Quarry	SaQ	0	121		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 129	2006	Sanctuary Quarry	SaQ	0	129		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 131	2006	Sanctuary Quarry	SaQ	0	131		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	SaQ1: 132	2006	Sanctuary Quarry	SaQ	0	132		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 50	2006	Sanctuary Quarry	SaQ	0	50		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	SaQ1: 54	2006	Sanctuary Quarry	SaQ	0	54		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching

74	SaQ1: 59	2006	Sanctuary Quarry	SaQ	0	59		*Porites*	*sp. 2 (branching form)*	1	Good	z-like	Extant	Extinct	Branching
74	SaQ1: 68	2006	Sanctuary Quarry	SaQ	0	68		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 69	2006	Sanctuary Quarry	SaQ	0	69		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 80	2006	Sanctuary Quarry	SaQ	0	80		*Porites*	*sp. 2 (branching form)*	1	Good-Average	z-like	Extant	Extinct	Branching
74	SaQ1: 81b	2006	Sanctuary Quarry	SaQ	0	81	b	*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 82	2006	Sanctuary Quarry	SaQ	0	82		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ1: 95	2006	Sanctuary Quarry	SaQ	0	95		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	SaQ2: 150	2006	Sanctuary Quarry	SaQ	0	150		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SaQ2: 76	2006	Sanctuary Quarry	SaQ	0	76		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ 17	2006	Sukau Road Quarry	SRQ	0	17		*Porites*	*sp. 2 (branching form)*	1	Average	z-like	Extant	Extinct	Branching
74	SRQ1: 10	2006	Sukau Road Quarry	SRQ	0	10		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 13	2006	Sukau Road Quarry	SRQ	0	13		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 14	2006	Sukau Road Quarry	SRQ	0	14		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 15	2006	Sukau Road Quarry	SRQ	0	15		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 16	2006	Sukau Road Quarry	SRQ	0	16		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 179	2006	Sukau Road Quarry	SRQ	0	179		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 18	2006	Sukau Road Quarry	SRQ	0	18		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 3	2006	Sukau Road Quarry	SRQ	0	3		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 4	2006	Sukau Road Quarry	SRQ	0	4		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 5	2006	Sukau Road Quarry	SRQ	0	5		*Porites*	*sp. 2 (branching form)*	1	Average-Poor	z-like	Extant	Extinct	Branching
74	SRQ1: 6	2006	Sukau Road Quarry	SRQ	0	6		*Porites*	*sp. 2 (branching form)*	1	Poor	z-like	Extant	Extinct	Branching
82	LSa1: 2037	2007	Lower Sanctuary Quarry	LSa	0	2037		*Scolymia*	*australis*	1		az-like	Extant	Extant	Solitary
59	1.7.298	2007	Sanctuary Quarry	1	7	298		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.3.1016	2007	Lower Sanctuary Quarry	4	3	1016		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.3.1018	2007	Lower Sanctuary Quarry	4	3	1018		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.6.1121	2007	Lower Sanctuary Quarry	4	6	1121		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.6.1147	2007	Lower Sanctuary Quarry	4	6	1147		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.6.1148	2007	Lower Sanctuary Quarry	4	6	1148		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.6.1166	2007	Lower Sanctuary Quarry	4	6	1166		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.8.1250	2007	Lower Sanctuary Quarry	4	8	1250		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.8.1260	2007	Lower Sanctuary Quarry	4	8	1260		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	4.8.1279	2007	Lower Sanctuary Quarry	4	8	1279		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	PP1: 287	2006	Police Outcrop	PO	0	287		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	SaQ1: 136	2006	Sanctuary Quarry	SaQ	0	136		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	SW 292	2006	Station West	SW	0	292		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Encrusting
59	SW1: 257	2006	Station West Quarry	SW	0	257		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
59	SW1: 265	2006	Station West Quarry	SW	0	265		*Stylocoeniella*	*guentheri*	1		z-like	Extant	Extant	Branching
56	2.1.457	2007	Rubbish Dump Quarry	2	1	457		*Stylophora*	*aff. danae*	1	Good	z-like	Extant	Extinct	Encrusting
56	4.1.856	2007	Lower Sanctuary Quarry	4	1	856		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
56	4.3.988	2007	Lower Sanctuary Quarry	4	3	988		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
56	LSa: 2011	2007	Lower Sanctuary Quarry	LSa	0	2011		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
56	LSa: 2024	2007	Lower Sanctuary Quarry	LSa	0	2024		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
56	PP1: 295	2006	Police Outcrop	PO	0	295		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
56	SW1: 275	2006	Station West Quarry	SW	0	275		*Stylophora*	*aff. danae*	1		z-like	Extant	Extinct	Encrusting
42	1.4.90 a	2007	Sanctuary Quarry	1	4	90	a	*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	1.6.181	2007	Sanctuary Quarry	1	6	181		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	1.7.253 e	2007	Sanctuary Quarry	1	7	253	e	*Stylophora*	*aff. tenuissima*	2		z-like	Extant	Extinct	Branching
42	1.8.346 c	2007	Sanctuary Quarry	1	8	346	c	*Stylophora*	*aff. tenuissima*	2		z-like	Extant	Extinct	Branching
42	1.8.346 d	2007	Sanctuary Quarry	1	8	346	d	*Stylophora*	*aff. tenuissima*	6		z-like	Extant	Extinct	Branching
42	1.8.347	2007	Sanctuary Quarry	1	8	347		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	1.8.355	2007	Sanctuary Quarry	1	8	355		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	1.8.357	2007	Sanctuary Quarry	1	8	357		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	1.9.382 c	2007	Sanctuary Quarry	1	9	382	c	*Stylophora*	*aff. tenuissima*	6		z-like	Extant	Extinct	Branching
42	5.-.1439	2007	Lake Quarry	5	1	1439		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	PP1: 401 a (i)	2006	Police Outcrop	PO	0	401	a (i)	*Stylophora*	*aff. tenuissima*	20		z-like	Extant	Extinct	Branching
42	PP1: 401 a (ii)	2006	Police Outcrop	PO	0	401	a (ii)	*Stylophora*	*aff. tenuissima*	1	Good	z-like	Extant	Extinct	Branching
42	SaQ1: 100	2006	Sanctuary Quarry	SaQ	0	100		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 101	2006	Sanctuary Quarry	SaQ	0	101		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 138	2006	Sanctuary Quarry	SaQ	0	138		*Stylophora*	*aff. tenuissima*	5		z-like	Extant	Extinct	Branching
42	SaQ1: 139	2006	Sanctuary Quarry	SaQ	0	139		*Stylophora*	*aff. tenuissima*	8		z-like	Extant	Extinct	Branching
42	SaQ1: 72	2006	Sanctuary Quarry	SaQ	0	72		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 81 f (i)	2006	Sanctuary Quarry	SaQ	0	81	f (i)	*Stylophora*	*aff. tenuissima*	15		z-like	Extant	Extinct	Branching
42	SaQ1: 87	2006	Sanctuary Quarry	SaQ	0	87		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 96	2006	Sanctuary Quarry	SaQ	0	96		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 97	2006	Sanctuary Quarry	SaQ	0	97		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SaQ1: 99	2006	Sanctuary Quarry	SaQ	0	99		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SW1: 278	2006	Station West Quarry	SW	0	278		*Stylophora*	*aff. tenuissima*	1		z-like	Extant	Extinct	Branching
42	SW1: 281/400 g	2006	Station West Quarry	SW	0	281/400	g	*Stylophora*	*aff. tenuissima*	4		z-like	Extant	Extinct	Branching
57	1.1.3	2007	Sanctuary Quarry	1	1	3		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	1.2.17	2007	Sanctuary Quarry	1	2	17		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	1.3.48	2007	Sanctuary Quarry	1	3	48		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	1.3.63	2007	Sanctuary Quarry	1	3	63		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	1.4.90 b	2007	Sanctuary Quarry	1	4	90	b	*Stylophora*	*pistillata*	1	Average	z-like	Extant	Extant	Branching
57	1.4.93	2007	Sanctuary Quarry	1	4	93		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	1.5.122	2007	Sanctuary Quarry	1	5	122		*Stylophora*	*pistillata*	1	Average-Poor	z-like	Extant	Extant	Branching

57	1.7.249	2007	Sanctuary Quarry	1	7	249		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	1.7.258	2007	Sanctuary Quarry	1	7	258		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	1.7.333	2007	Sanctuary Quarry	1	7	333		*Stylophora*	*pistillata*	1	Average-Poor	z-like	Extant	Extant	Branching
57	1.8.346 e	2007	Sanctuary Quarry	1	8	346	e	*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	1.8.346 e (i)	2007	Sanctuary Quarry	1	8	346	e (i)	*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	1.8.349	2007	Sanctuary Quarry	1	8	349		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	4.2.920	2007	Lower Sanctuary Quarry	4	2	920		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	4.3.1013	2007	Lower Sanctuary Quarry	4	3	1013		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	4.3.970	2007	Lower Sanctuary Quarry	4	3	970		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	4.3.982	2007	Lower Sanctuary Quarry	4	3	982		*Stylophora*	*pistillata*	1		z-like	Extant	Extant	Branching
57	4.5.1081	2007	Lower Sanctuary Quarry	4	5	1081		*Stylophora*	*pistillata*	1	Average	z-like	Extant	Extant	Branching
57	4.6.1172	2007	Lower Sanctuary Quarry	4	6	1172		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	4.8.1276	2007	Lower Sanctuary Quarry	4	8	1276		*Stylophora*	*pistillata*	1	Average-Poor	z-like	Extant	Extant	Branching
57	5.-.1399	2007	Lake Quarry	5	4	1399		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	5.-.1401	2007	Lake Quarry	5	4	1401		*Stylophora*	*pistillata*	1	Average	z-like	Extant	Extant	Branching
57	5.-.1402	2007	Lake Quarry	5	7	1402		*Stylophora*	*pistillata*	1	Average	z-like	Extant	Extant	Branching
57	5.-.1420	2007	Lake Quarry	5	0	1420		*Stylophora*	*pistillata*	1	Average-Poor	z-like	Extant	Extant	Branching
57	5.-.1421	2007	Lake Quarry	5	1	1421		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	5.-.1422	2007	Lake Quarry	5	3	1422		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	5.-.1423	2007	Lake Quarry	5	7	1423		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	5.-.1424	2007	Lake Quarry	5	1	1424		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	5.-.1457	2007	Lake Quarry	5	0	1457		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	LQ: 2015	2007	Lake Quarry	LQ	0	2015		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	LSa: 2022	2007	Lower Sanctuary Quarry	LSa	0	2022		*Stylophora*	*pistillata*	1	Good	z-like	Extant	Extant	Branching
57	LSa1: 204	2006	Lower Sanctuary Quarry	LSa	0	204		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	LSa2: 222	2006	Lower Sanctuary Quarry	LSa	0	222		*Stylophora*	*pistillata*	1	Good-Average	z-like	Extant	Extant	Branching
57	LSa2: 225 j	2006	Lower Sanctuary Quarry	LSa	0	225	j	*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	SaQ1: 81 f (ii)	2006	Sanctuary Quarry	SaQ	0	81	f (ii)	*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	SaQ1: 84	2006	Sanctuary Quarry	SaQ	0	84		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	SaQ1: 88	2006	Sanctuary Quarry	SaQ	0	88		*Stylophora*	*pistillata*	1	Poor	z-like	Extant	Extant	Branching
57	SW1: 269	2006	Station West Quarry	SW	0	269		*Stylophora*	*pistillata*	1	Average-Poor	z-like	Extant	Extant	Branching
80	1.-.368	2007	Sanctuary Quarry	1	0	368		*Trachyphyllia*	*sp.*	1	Average-Poor	az-like	Extant	Extinct	Solitary
80	1.1.5	2007	Sanctuary Quarry	1	1	5		*Trachyphyllia*	*sp.*	1	Average	az-like	Extant	Extinct	Solitary
80	1.3.52	2007	Sanctuary Quarry	1	3	52		*Trachyphyllia*	*sp.*	1	Average-Poor	az-like	Extant	Extinct	Solitary
80	1.7.309	2007	Sanctuary Quarry	1	7	309		*Trachyphyllia*	*sp.*	1	Average-Poor	az-like	Extant	Extinct	Solitary
80	3.5.787	2007	Mosque Quarry III	3	5	787		*Trachyphyllia*	*sp.*	1	Good-Average	az-like	Extant	Extinct	Solitary
80	SaQ2: 159	2006	Sanctuary Quarry	SaQ	0	159		*Trachyphyllia*	*sp.*	1	Average	az-like	Extant	Extinct	Solitary
80	SaQ2: 163	2006	Sanctuary Quarry	SaQ	0	163		*Trachyphyllia*	*sp.*	1	Average-Poor	az-like	Extant	Extinct	Solitary
81	1.-.367	2007	Sanctuary Quarry	1	0	367		*Trachyphyllia*	*sp. (trochoid)*	1	Average	az-like	Extant	Extinct	Solitary
81	1.2.29	2007	Sanctuary Quarry	1	2	29		*Trachyphyllia*	*sp. (trochoid)*	1	Poor	az-like	Extant	Extinct	Solitary
81	1.3.53	2007	Sanctuary Quarry	1	3	53		*Trachyphyllia*	*sp. (trochoid)*	1	Average-Poor	az-like	Extant	Extinct	Solitary
81	1.7.227	2007	Sanctuary Quarry	1	7	227		*Trachyphyllia*	*sp. (trochoid)*	1	Average-Poor	az-like	Extant	Extinct	Solitary
81	1.7.267	2007	Sanctuary Quarry	1	7	267		*Trachyphyllia*	*sp. (trochoid)*	1	Good-Average	az-like	Extant	Extinct	Solitary
81	1.7.275	2007	Sanctuary Quarry	1	7	275		*Trachyphyllia*	*sp. (trochoid)*	1	Poor	az-like	Extant	Extinct	Solitary
81	1.7.335	2007	Sanctuary Quarry	1	7	335		*Trachyphyllia*	*sp. (trochoid)*	1	Good-Average	az-like	Extant	Extinct	Solitary
81	1.7.92	2007	Sanctuary Quarry	1	7	92		*Trachyphyllia*	*sp. (trochoid)*	1	Good	az-like	Extant	Extinct	Solitary
81	1.8.343	2007	Sanctuary Quarry	1	8	343		*Trachyphyllia*	*sp. (trochoid)*	1	Poor	az-like	Extant	Extinct	Solitary
81	SaQ2: 158	2006	Sanctuary Quarry	SaQ	0	158		*Trachyphyllia*	*sp. (trochoid)*	1	Average	az-like	Extant	Extinct	Solitary
81	SW1: 272	2006	Station West Quarry	SW	0	272		*Trachyphyllia*	*sp. (trochoid)*	1	Good-Average	az-like	Extant	Extinct	Solitary
96	SaQ2: 162	2006	Sanctuary Quarry	SaQ	0	162		*Trachyphyllia*	*sp. 1*	1		az-like	Extant	Extinct	Solitary
7	4.1.841	2007	Lower Sanctuary Quarry	4	1	841		*Trochoseris*	*aff. florescens*	1	Average	az-like	Exinct	Extinct	Solitary
7	4.2.892	2007	Lower Sanctuary Quarry	4	2	892		*Trochoseris*	*aff. florescens*	1	Good-Average	az-like	Exinct	Extinct	Solitary
7	LQ: 2013	2007	Lake Quarry	LQ	0	2013		*Trochoseris*	*aff. florescens*	1	Average	az-like	Exinct	Extinct	Solitary
7	LSa: 209	2006	Lower Sanctuary Quarry	LSa	0	209		*Trochoseris*	*aff. florescens*	1	Good-Average	az-like	Exinct	Extinct	Solitary
19	5.-.1425	2007	Lake Quarry	5	2	1425		*Turbinaria*	*aff. irregularis*	1		z-like	Extant	Extinct	Platy
19	1.2.26	2007	Sanctuary Quarry	1	2	26		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	1.7.250	2007	Sanctuary Quarry	1	7	250		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	1.7.265	2007	Sanctuary Quarry	1	7	265		*Turbinaria*	*aff.irregularis*	1	Poor (has scallop-type shell attached)	z-like	Extant	Extinct	Platy
19	1.7.313	2007	Sanctuary Quarry	1	7	313		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	1.8.351	2007	Sanctuary Quarry	1	8	351		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	2.1.437	2007	Rubbish Dump Quarry	2	1	437		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	2.1.460	2007	Rubbish Dump Quarry	2	1	460		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	2.3.506	2007	Rubbish Dump Quarry	2	3	506		*Turbinaria*	*aff.irregularis*	1	Average	z-like	Extant	Extinct	Platy
19	3.1.668	2007	Mosque Quarry III	3	1	668		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	4.1.852	2007	Lower Sanctuary Quarry	4	1	852		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	4.2.887	2007	Lower Sanctuary Quarry	4	2	887		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	4.2.900	2007	Lower Sanctuary Quarry	4	2	900		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy
19	4.2.906	2007	Lower Sanctuary Quarry	4	2	906		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	4.2.913	2007	Lower Sanctuary Quarry	4	2	913		*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
19	4.5.1027	2007	Lower Sanctuary Quarry	4	5	1027		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy
19	5.-.1426	2007	Lake Quarry	5	0	1426		*Turbinaria*	*aff.irregularis*	1	Good-Average	z-like	Extant	Extinct	Platy
19	NQ1: 186	2006	Neil's Quarry	NQ	0	186		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy
19	NQ1: 187	2006	Neil's Quarry	NQ	0	187		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy
19	NQ1: 190	2006	Neil's Quarry	NQ	0	190		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy
19	NQ1: 191	2006	Neil's Quarry	NQ	0	191		*Turbinaria*	*aff.irregularis*	1	Poor (might be fourth species?)	z-like	Extant	Extinct	Platy

19	PO: 410	2007	Police Outcrop	PO	0	410	*Turbinaria*	*aff.irregularis*	1	Good	z-like	Extant	Extinct	Platy
19	PO: 429	2007	Police Outcrop	PO	0	429	*Turbinaria*	*aff.irregularis*	1	Average	z-like	Extant	Extinct	Platy
19	PP1: 317	2006	Police Outcrop	PO	0	317	*Turbinaria*	*aff.irregularis*	1	Average	z-like	Extant	Extinct	Platy
19	SW1: 251	2006	Station West Quarry	SW	0	251	*Turbinaria*	*aff.irregularis*	1	Poor	z-like	Extant	Extinct	Platy
29	1.6.206	2007	Sanctuary Quarry	1	6	206	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	1.7.242	2007	Sanctuary Quarry	1	7	242	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	2.1.411	2007	Rubbish Dump Quarry	2	1	411	*Turbinaria*	*aff.reniformis*	1	Average-Good	z-like	Extant	Extinct	Platy
29	2.1.412	2007	Rubbish Dump Quarry	2	1	412	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	2.1.424	2007	Rubbish Dump Quarry	2	1	424	*Turbinaria*	*aff.reniformis*	1	Average	z-like	Extant	Extinct	Platy
29	2.2.474	2007	Rubbish Dump Quarry	2	2	474	*Turbinaria*	*aff.reniformis*	1	Average	z-like	Extant	Extinct	Platy
29	2.4.524	2007	Rubbish Dump Quarry	2	4	524	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	2.7.587	2007	Rubbish Dump Quarry	2	7	587	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	4.1.869	2007	Lower Sanctuary Quarry	4	1	869	*Turbinaria*	*aff.reniformis*	1	Average	z-like	Extant	Extinct	Platy
29	4.3.956	2007	Lower Sanctuary Quarry	4	3	956	*Turbinaria*	*aff.reniformis*	1	Average	z-like	Extant	Extinct	Platy
29	4.5.1062	2007	Lower Sanctuary Quarry	4	5	1062	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	4.5.1090	2007	Lower Sanctuary Quarry	4	5	1090	*Turbinaria*	*aff.reniformis*	1	Average-Poor	z-like	Extant	Extinct	Platy
29	5.-.1440	2007	Lake Quarry	5	0	1440	*Turbinaria*	*aff.reniformis*	1	Poor	z-like	Extant	Extinct	Platy
29	LSa: 2000	2007	Lower Sanctuary Quarry	LSa	0	2000	*Turbinaria*	*aff.reniformis*	1	Average-Poor	z-like	Extant	Extinct	Platy
29	PP1: 306	2006	Police Outcrop	PO	0	306	*Turbinaria*	*aff.reniformis*	1	Average	z-like	Extant	Extinct	Platy
20	1.2.30	2007	Sanctuary Quarry	1	2	30	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	2.1.409	2007	Rubbish Dump Quarry	2	1	409	*Turbinaria*	*tenuis*	1	Good	z-like	Extant	Extinct	Platy
20	2.1.420	2007	Rubbish Dump Quarry	2	1	420	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	2.1.436	2007	Rubbish Dump Quarry	2	1	436	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	2.1.459	2007	Rubbish Dump Quarry	2	1	459	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	2.2.470	2007	Rubbish Dump Quarry	2	2	470	*Turbinaria*	*tenuis*	1	Good	z-like	Extant	Extinct	Platy
20	3.1.635	2007	Mosque Quarry III	3	1	635	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	4.2.895	2007	Lower Sanctuary Quarry	4	2	895	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	4.2.910	2007	Lower Sanctuary Quarry	4	2	910	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	4.2.930	2007	Lower Sanctuary Quarry	4	2	930	*Turbinaria*	*tenuis*	1	Poor (has pretty foram on it)	z-like	Extant	Extinct	Platy
20	4.5.1060	2007	Lower Sanctuary Quarry	4	5	1060	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	4.5.1076	2007	Lower Sanctuary Quarry	4	5	1076	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	4.5.1085	2007	Lower Sanctuary Quarry	4	5	1085	*Turbinaria*	*tenuis*	1	Poor	z-like	Extant	Extinct	Platy
20	4.5.1087	2007	Lower Sanctuary Quarry	4	5	1087	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	4.5.1092	2007	Lower Sanctuary Quarry	4	5	1092	*Turbinaria*	*tenuis*	1	Average-Poor	z-like	Extant	Extinct	Platy
20	4.6.1109	2007	Lower Sanctuary Quarry	4	6	1109	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	4.6.1115	2007	Lower Sanctuary Quarry	4	6	1115	*Turbinaria*	*tenuis*	1	Good	z-like	Extant	Extinct	Platy
20	4.6.1122	2007	Lower Sanctuary Quarry	4	6	1122	*Turbinaria*	*tenuis*	2	Average	z-like	Extant	Extinct	Platy
20	4.6.1137	2007	Lower Sanctuary Quarry	4	6	1137	*Turbinaria*	*tenuis*	1	Average-Poor	z-like	Extant	Extinct	Platy
20	5.-.1364	2007	Lake Quarry	5	3	1364	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1365	2007	Lake Quarry	5	6	1365	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1366	2007	Lake Quarry	5	4	1366	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1367	2007	Lake Quarry	5	8	1367	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1368	2007	Lake Quarry	5	8	1368	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1369	2007	Lake Quarry	5	8	1369	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1370	2007	Lake Quarry	5	8	1370	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1371	2007	Lake Quarry	5	1	1371	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1372	2007	Lake Quarry	5	4	1372	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1373	2007	Lake Quarry	5	7	1373	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	5.-.1415	2007	Lake Quarry	5	6	1415	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	LQ2: 2035	2007	Lake Quarry	LQ	0	2035	*Turbinaria*	*tenuis*	1	Average	z-like	Extant	Extinct	Platy
20	LSa1: 207	2006	Lower Sanctuary Quarry	LSa	0	207	*Turbinaria*	*tenuis*	1	Average-Poor	z-like	Extant	Extinct	Platy
20	LSa1: 208	2006	Lower Sanctuary Quarry	LSa	0	208	*Turbinaria*	*tenuis*	1	Good	z-like	Extant	Extinct	Platy

Specimen label	locality	sample no.	GPS Coordinates: N:	GPS Coordinates: E:	Age (NP zone)	Type of sample
LQ: 2007	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2009	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2013	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2029 a	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2029 b	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1426	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ2: 2035	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2014	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1440	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2016	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1343	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1344	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1345	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1346	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1347	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1348	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1349	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1350	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1351	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1352	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1353	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1354	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1355	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1356	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1420	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1457	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2015	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1446	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1452	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1453	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ: 2018	Lake Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
5.-.1293	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1294	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1296	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1298	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1341	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count

5.-.1342	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1357	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1359	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1361	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1403	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1376	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1378	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1379	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1382	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1384	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1318	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1319	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1330	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1334	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1335	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1449	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1371	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1439	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1419	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1407	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1433	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1421	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1424	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1455	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1456	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1431 (b)	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1431 (a)	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1311	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1387	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1394	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1396	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1397	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1460.	Lake Quarry	1	5.512139	118.277644	NP 24/25	Timed Count
5.-.1292	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1297	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1302	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1383	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count

5.-.1323	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1331	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1411	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1418	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1425	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1430.	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1458	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1454	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1443	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1445	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1308	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1309	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1312	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1313	Lake Quarry	2	5.512139	118.277644	NP 24/25	Timed Count
5.-.1362	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1314	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1328	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1332	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1364	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1408	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1422	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1307	Lake Quarry	3	5.512139	118.277644	NP 24/25	Timed Count
5.-.1299	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1300.	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1390.	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1391	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1377	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1329	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1336	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1338	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1366	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1372	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1406	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1432	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1399	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1401	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1428	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count

5.-.1447	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1306	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1395	Lake Quarry	4	5.512139	118.277644	NP 24/25	Timed Count
5.-.1295	Lake Quarry	5	5.512139	118.277644	NP 24/25	Timed Count
5.-.1358	Lake Quarry	5	5.512139	118.277644	NP 24/25	Timed Count
5.-.1360.	Lake Quarry	5	5.512139	118.277644	NP 24/25	Timed Count
5.-.1316	Lake Quarry	5	5.512139	118.277644	NP 24/25	Timed Count
5.-.1305	Lake Quarry	5	5.512139	118.277644	NP 24/25	Timed Count
5.-.1386	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1322	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1388	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1304	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1381	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1320	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1337	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1365	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1415	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1405	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1393	Lake Quarry	6	5.512139	118.277644	NP 24/25	Timed Count
5.-.1340	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1389	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1404	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1303	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1392	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1385	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1315	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1317	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1321	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1324	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1326	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1327	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1373	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1417	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1402	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1423	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1400	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1414	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count

5.-.1450	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1310	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1398	Lake Quarry	7	5.512139	118.277644	NP 24/25	Timed Count
5.-.1291	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1363	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1434	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1301	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1375	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1333	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1339	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1412	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1367	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1368	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1369	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1370	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1437	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1438	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1374	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1410	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1409	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
5.-.1444	Lake Quarry	8	5.512139	118.277644	NP 24/25	Timed Count
LQ/LSaQ: 2026	Lake Quarry/Lower Sanctuary Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LQ/LSaQ: 2039	Lake Quarry/Lower Sanctuary Quarry	0	5.512139	118.277644	NP 24/25	Random Collection
LSa: 2036	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 205	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 230	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2001	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2005	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 200	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 226	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 231	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 199	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 2027	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 206	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 202	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2006	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2010	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection

LSa1: 203	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 212	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 227	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 228	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 229	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 239	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 244	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 246	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa 245	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 209	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2020	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 2027 b	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 213 b	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 235	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2028	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2002	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2003	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 196	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 207	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 208	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 197	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 223	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa 198	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2000	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2021	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2017	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 l	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 243	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSaQ: 2041	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2011	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2024	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2022	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 204	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 222	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 j	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 242	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSaQ2: 220	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection

LSa: 2032	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 e (i)	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 h	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa 402 (a)	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2008	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 d	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 f	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 240	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 402	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 b	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 e	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 g	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 225 k	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 2037	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa2: 234	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa1: 78	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2031	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2019	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa: 2034	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
LSa 241	Lower Sanctuary Quarry	0	5.511594	118.278056	NP 25	Random Collection
4.1.849	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.864	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.867	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.874	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1 866	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.834	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.847	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.868	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.876	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.877	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.880	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.870	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.879	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.836	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.857	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.861	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.862	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count

4.1.873	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.878	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.871	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.839	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.854	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.841	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.852	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.833	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.835	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.838	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.842	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.843	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.846	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.850	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.851	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.869	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.856	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.845	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.858	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.859 a (i)	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.859 (c)(ii)	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.859 (b)	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.831 b	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.859 c (i)	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.853	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.855	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.840	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.1.831 a	Lower Sanctuary Quarry	1	5.511594	118.278056	NP 25	Timed Count
4.2.1010	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.884	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.923	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.932	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.914	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.922	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.891	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.925	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.927	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count

4.2.934	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.935	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.1152	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.886	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.899	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.916	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.924	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.929	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.892	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.1287	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.904	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.904 b	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.887	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.900	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.906	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.913	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.895	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.910	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.930	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.881	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.882	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.889	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.890	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.893	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.905	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.915	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.894	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.912	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.920	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.897	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.917 d	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.917 c	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.917 i	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.917 f	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.888	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.907	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.2.909	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count

4.2.928	Lower Sanctuary Quarry	2	5.511594	118.278056	NP 25	Timed Count
4.3.1004	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1008	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1012	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1014	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1017	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.952	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.966	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1001	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1007	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1009	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.980	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.995	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1015	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.985	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.942	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.973	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.959	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.981	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.990	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.1000	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.948	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.949	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.963	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.964	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.965	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.937	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.968	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1002	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1003	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.936	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count

4.3.941	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.971	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.987	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
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4.3.994	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.956	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.946	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1019	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1011	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 b	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.940	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.988	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1013	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.970	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.982	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1016	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1018	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1020	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 a	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 c	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 c (i)	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 c (ii)	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 d	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.1022 g	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.943	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.969	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.974	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.976	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.989	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.996	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.953	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.960	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count
4.3.967	Lower Sanctuary Quarry	3	5.511594	118.278056	NP 25	Timed Count

4.4.1043	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1042	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1047	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1048	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1028	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
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4.4.1039	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1033	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1055 b	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1055	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1031	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
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4.4.1036	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1037	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1044	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1046	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
4.4.1045	Lower Sanctuary Quarry	4	5.511594	118.278056	NP 25	Timed Count
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4.5.1095	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1101	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1084	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1099	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1078	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1080	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1088	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1097	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1056	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1070	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1075	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1073	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1063	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1066	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1069	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1071	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1094	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count

4.5.1027	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1060	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1076	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1085	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1087	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1092	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1074	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1064	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1065	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1068	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1077	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1083	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1062	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1090	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1081	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1082	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1102 (b) (i)	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1102 a	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1102 b	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1059	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1086	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1089	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1091	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1096	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1098	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1100	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.5.1093	Lower Sanctuary Quarry	5	5.511594	118.278056	NP 25	Timed Count
4.6.1106	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1125	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1135	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1161	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1176	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1179	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count

4.6.1181	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1185	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1187	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1188	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1190	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1191	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1131	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1146	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1159	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1180	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1184	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1174	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1177	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1189	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1105	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1130	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1150	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1156	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1164	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1170	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1113	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1116	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1134	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1136	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1153	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
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4.6.1107	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1114	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1109	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1115	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count

4.6.1122	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1137	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1108	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1110	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1118	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1123	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1127	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1129	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1132	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1139	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1142	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1145	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1155	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1168	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1119	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1128	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1172	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1121	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1147	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1148	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1166	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1151	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1169	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1192 (b) (ii)	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1192 b	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.1167	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.6.577	Lower Sanctuary Quarry	6	5.511594	118.278056	NP 25	Timed Count
4.7.1220	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1221	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1223	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1227	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1228	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1229	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1211	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1224	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1225	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1226	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count

4.7.1214	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1195	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1200	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1203	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1208	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1215	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1206	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1201	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1219	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1199	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1210	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1213	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1222	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.7.1196	Lower Sanctuary Quarry	7	5.511594	118.278056	NP 25	Timed Count
4.8.1252	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1266	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1274	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1288	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1277	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1284	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1283	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1233	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1239	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1243	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1253	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1268	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1258	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1235	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1236	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1256	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1262	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1232	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1244	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1245	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1246	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1249	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1259	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count

4.8.1261	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1265	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1278	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1282	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1240	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1248	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1271	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1238	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1276	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1273	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1250	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1260	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1279	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1289	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1263	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1272	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1280	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
4.8.1286	Lower Sanctuary Quarry	8	5.511594	118.278056	NP 25	Timed Count
MQ2 168	Mosque Quarry II	0	5.544594	118.193014	NP 25	Random Collection
MQ2 1: 164	Mosque Quarry II	0	5.544594	118.193014	NP 25	Random Collection
MQ III: 2025	Mosque Quarry III	0	5.543878	118.193522	NP 25	Random Collection
3.1.636	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.671	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.668	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.635	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.663	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.670	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.617	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.652	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.659	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.672	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.650	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.658	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.665	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.1.666	Mosque Quarry III	1	5.543878	118.193522	NP 25	Timed Count
3.2.717	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.697	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count

3.2.674	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.708	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.685	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.694	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.696	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.714	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.719	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.681	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.682	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.690	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.698	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.700	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.705	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.706	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.2.715	Mosque Quarry III	2	5.543878	118.193522	NP 25	Timed Count
3.3.735	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.749	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.744	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.745	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.747	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.758	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.754	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.755	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.3.762	Mosque Quarry III	3	5.543878	118.193522	NP 25	Timed Count
3.4.764	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.766	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.768	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.774	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.777	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.769	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.4.771	Mosque Quarry III	4	5.543878	118.193522	NP 25	Timed Count
3.5.795	Mosque Quarry III	5	5.543878	118.193522	NP 25	Timed Count
3.5.790	Mosque Quarry III	5	5.543878	118.193522	NP 25	Timed Count
3.5.791	Mosque Quarry III	5	5.543878	118.193522	NP 25	Timed Count
3.5.792	Mosque Quarry III	5	5.543878	118.193522	NP 25	Timed Count
3.5.787	Mosque Quarry III	5	5.543878	118.193522	NP 25	Timed Count
3.6.824	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count

3.6.827	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.828	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.806	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.807	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.821	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.822	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.825	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
3.6.829	Mosque Quarry III	6	5.543878	118.193522	NP 25	Timed Count
NQ1: 194	Neil's Quarry	0	5.533897	118.169803	NP 25	Random Collection
NQ1: 186	Neil's Quarry	0	5.533897	118.169803	NP 25	Random Collection
NQ1: 187	Neil's Quarry	0	5.533897	118.169803	NP 25	Random Collection
NQ1: 190	Neil's Quarry	0	5.533897	118.169803	NP 25	Random Collection
NQ1: 191	Neil's Quarry	0	5.533897	118.169803	NP 25	Random Collection
PO: 415	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 436	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 437	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 439	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 219	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 312	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 2004	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 2030	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 411	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 412	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 413	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 414	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 419	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 423	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 424	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 427	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 430	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 301	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 304	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 310	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 329	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 217	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 313	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 324	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection

PP1: 325	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 326	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 214	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 311	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 318	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 327	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1:303	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 321	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 416	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 410	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 429	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 317	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 323	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 330	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 434	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 435	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 215	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 300	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 302	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 316	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 320	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 315	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 306	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 418	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 297	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 c (ii)	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 a (i)	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 a (ii)	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 b	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 295	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 287	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 314	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 431	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 432	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 401 (e)	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 c (i)	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 401 h	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection

PP1: 401 i	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP2: 401 g	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 420	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 421	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 426	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 218	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 309	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PP1: 328	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 305	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 422	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 433	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 428	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO 299	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 425	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
PO: 417	Police Outcrop	0	5.509394	118.286906	NP 25	Random Collection
2.-.607	Rubbish Dump Quarry	0	5.510417	118.278808	NP 25	Random Collection
2.1.403	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.405	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.406	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.408	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.413	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.396	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.422	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.423	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.426	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.429	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.419	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.422 (b)	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.435	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.443	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.404	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.425	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.430	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.437	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.460	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.409	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.420	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count

2.1.436	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.459	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.416	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.439	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.441	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.445	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.447	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.456	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.411	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.412	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.424	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.451	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.393	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.457	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.410	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.433	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.446	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.450	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.452	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.398	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.400	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.415	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.428	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.440	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.1.417	Rubbish Dump Quarry	1	5.510417	118.278808	NP 25	Timed Count
2.2.467	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.473	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.475	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.470	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.469	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.476	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.484	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.489	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.474	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.471	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.485	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count
2.2.468	Rubbish Dump Quarry	2	5.510417	118.278808	NP 25	Timed Count

2.3.495	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.496	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.504	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.505	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.479	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.490	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.491	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.502	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.508	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.497	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.493	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.506	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.494	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.501	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.3.507	Rubbish Dump Quarry	3	5.510417	118.278808	NP 25	Timed Count
2.4.526	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.534	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.544	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.519	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.535	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.537	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.531	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.521	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.523	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.525	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.527	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.528	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.532	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.538	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.543	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.524	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.520	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.529	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.533	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.522	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.536	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.4.541	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count

2.4.536	Rubbish Dump Quarry	4	5.510417	118.278808	NP 25	Timed Count
2.5.552	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.550	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.560	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.545	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.547	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.553	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.554	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.555 b	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.549	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.5.551	Rubbish Dump Quarry	5	5.510417	118.278808	NP 25	Timed Count
2.6.562	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.566	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.578	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.571	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.565	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.568	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.561	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.579	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.6.580	Rubbish Dump Quarry	6	5.510417	118.278808	NP 25	Timed Count
2.7.601	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.604	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.605	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.584	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.590	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.592	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.594	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.598	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.599	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.603	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.587	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.588	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.582	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.586	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.597	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.600	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count
2.7.583	Rubbish Dump Quarry	7	5.510417	118.278808	NP 25	Timed Count

SaQ1: 49	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 137	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ 160	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 123	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 125	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 98	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 83	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 71	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 128	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ: 94	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 104	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 100	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 101	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 138	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 139	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 72	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81 f (i)	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 87	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 96	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 97	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 99	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 51	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 52	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 92	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 117	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 118	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81 a	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81 c	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ3: 30/10/06 b (2(	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81 f (ii)	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 84	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 88	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 136	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 112	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 114	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 116	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 133	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection

SaQ1: 65	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81 f	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 143	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 144	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 2038	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 115	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 85	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 86	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 106	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 107	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 111	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 120	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 121	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 129	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 131	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 132	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 50	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 54	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 59	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 68	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 69	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 80	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81b	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 82	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 95	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 150	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 76	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 102	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 113	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 119	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 130	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 210	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 36	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 58	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 60	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 61	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 62	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection

SaQ1: 63	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 66	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 81e	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 91	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 140	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 156	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ 161	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 142	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 134	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ1: 147	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
1.-.368	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 159	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 163	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
1.-.367	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 158	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
1.-.14 a	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ2: 162	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
SaQ 105	Sanctuary Quarry	0	5.511369	118.276592	NP 24	Random Collection
1.1.9	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.1	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.3	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.11	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.2	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.10	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.7	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.8	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.1.5	Sanctuary Quarry	1	5.511369	118.276592	NP 24	Timed Count
1.2.33	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.21	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.22	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.24	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.34 a	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.34 b	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.32	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.37	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.36	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.26	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count

1.2.30	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.23	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.25	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.17	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.18	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.28	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.27	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.31	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.14	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.16	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.19	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.29	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.2.35	Sanctuary Quarry	2	5.511369	118.276592	NP 24	Timed Count
1.3.44	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.51	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.45	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.50	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.60	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.61	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.58	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.55	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.56	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.39	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.57	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.48	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.63	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.40	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.54	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.71	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.41	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.42	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.64	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.65	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.66	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.67	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.72	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.3.52	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count

1.3.53	Sanctuary Quarry	3	5.511369	118.276592	NP 24	Timed Count
1.4.99	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.73 a	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.111	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.74	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.90 a	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.74 d	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.79	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.97	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.82	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.90 b	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.93	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.108	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.74 (b)	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.101	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.106	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.107	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.85	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.87	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.98	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.75	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.81	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.91	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.94	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.89	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.4.100	Sanctuary Quarry	4	5.511369	118.276592	NP 24	Timed Count
1.5.134	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.139	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.129	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.160	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.146	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.140	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.143	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.123	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.149	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.158	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.162	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count

1.5.115	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.118	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.122	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.155	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.159	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.116	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.168	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.130	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.136	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.112	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.126	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.164	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.131	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.137	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.138	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.147	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.151	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.153	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.166	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.147 (b)	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.5.150	Sanctuary Quarry	5	5.511369	118.276592	NP 24	Timed Count
1.6.74 a	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.183	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.171	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.180	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.206	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.174	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.181	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.178	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.194	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.200	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.205	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.169	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.176	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.177	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.184	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.188	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count

1.6.189	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.196	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.199	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.207	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.210	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.211	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.212	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.213	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.215	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.216	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.217	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.218	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.219	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.222	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.6.201	Sanctuary Quarry	6	5.511369	118.276592	NP 24	Timed Count
1.7.288	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.292	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.323	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.276	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.290	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.295	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.299	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.304	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.327	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.329	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.254 b	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.285	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.233	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.254 a	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.247	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.302	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.334	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.336 a	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.336 b	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.336 c	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.244	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.308	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count

1.7.255	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.301	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.250	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.265	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.313	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.228	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.229	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.234	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.231	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.242	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.316	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.253 e	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.232	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.269	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.235	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.251	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.337 (a)	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.249	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.258	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.333	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.298	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.224	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.262	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.289	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.310	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.261	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.243 a	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.243 b	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.243 c	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.243 d	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.253 b	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.253 j	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.263	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.337 (b)	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.226	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.237	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.238	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count

1.7.241	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.246	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.248	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.253	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.253 c	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.259	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.287	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.293	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.305	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.311	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.312	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.314	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.315	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.331	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.240	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.256	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.268	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.273	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.282	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.284	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.306	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.328	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.239	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.245	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.274	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.307	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.321	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.330	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.332	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.309	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.227	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.267	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.275	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.92	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.7.335	Sanctuary Quarry	7	5.511369	118.276592	NP 24	Timed Count
1.8.354	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.365	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count

1.8.362	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.351	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.340	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.346 c	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.346 d	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.347	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.355	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.357	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.552	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.350	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.359	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.346 e	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.346 e (i)	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.349	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.338	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.339	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.353	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.363	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.344	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.345	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.348	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.358	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.364	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.341	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.342	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.361	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.8.343	Sanctuary Quarry	8	5.511369	118.276592	NP 24	Timed Count
1.9.387	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.391	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.382 c	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.376	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.384	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.382 d	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.380	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.390	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.373	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.385	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count

1.9.386	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.392	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.395	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.369	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
1.9.388	Sanctuary Quarry	9	5.511369	118.276592	NP 24	Timed Count
SW: 252	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW: 292	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 260	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 262	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 266	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 268	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 280	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 261	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 250	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 282	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1 :253	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 238	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 249	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 254	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 255	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 256	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 2023	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 251	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 400	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 278	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 281/400 g	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 289	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 290	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 275	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 269	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 257	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 265	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 263	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 264	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 2033	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 279	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 284	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection

SW1: 285	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 273	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 400 c (i)	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 400 c (ii)	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 281/400 f	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 281/400 f a (	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 274	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1:281/ 400 h	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 247	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 248	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SW1: 272	Station West Quarry	0	5.510025	118.278131	NP 24/25	Random Collection
SRQ3: 23	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ 1: 1	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ 20	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 21	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 9	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 10	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 13	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 14	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 15	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 16	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 179	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 18	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 3	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 4	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 5	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 6	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ 17	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 12	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 7	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection
SRQ1: 8	Sukau Road Quarry	0	5.546586	118.169803	NP 24	Random Collection